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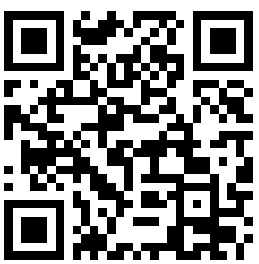

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CLEMENTS R. MARKHAM, C.B., F.R.S.

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Map of a portion OF AFGHANISTAN

From Surveys made before the Evacuation of Candahar and Cabul.

BY

Lieut. Wm FRASER TYTLER.

Deputy Assist. Qr. Mr. General.

SCALE

The nomenclature of the Original map has been retained throughout

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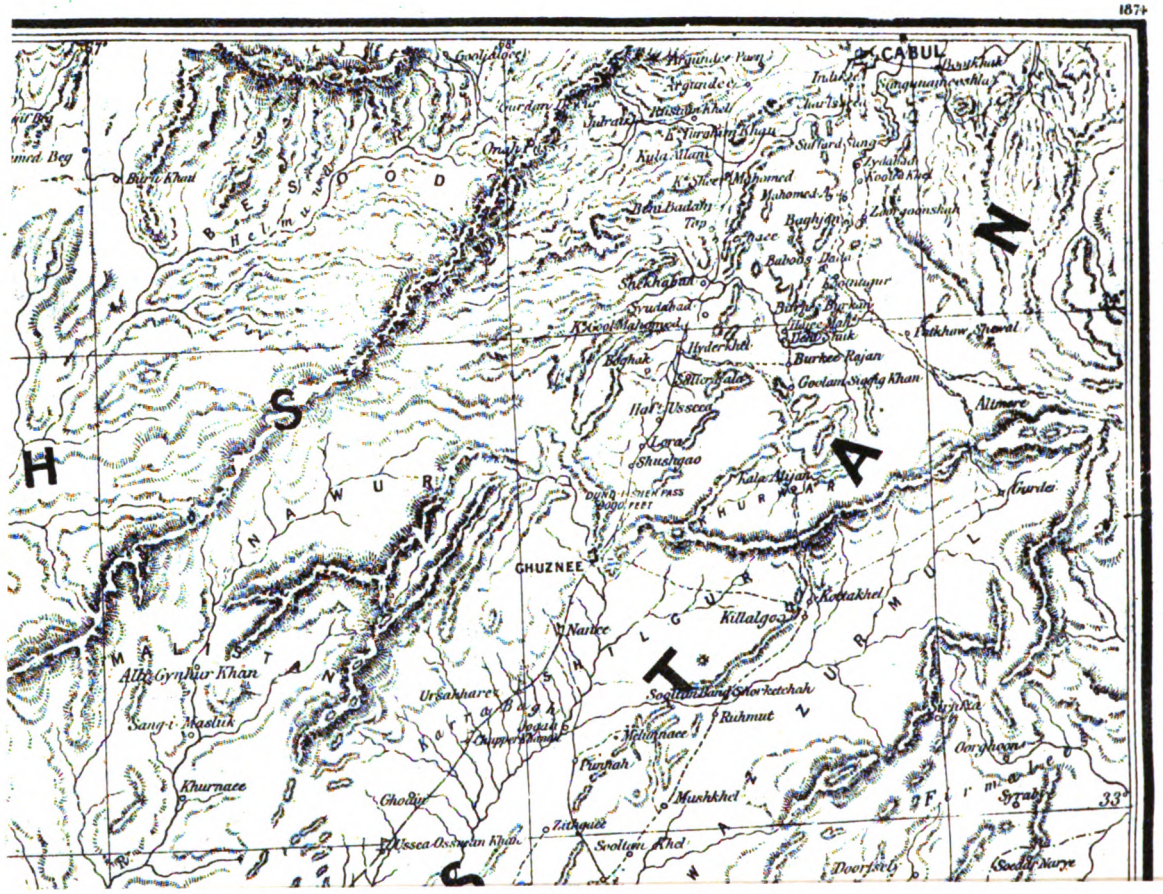

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THE

GEOGRAPHICAL MAGAZINE.

APRIL, 1874.

THE BASIN OF THE HELMUND.

THE basin of the Helmund, including all the streams which flow down into the great lake or swamp of Sistan, lies right athwart the line of advance from the north towards India. It forms the natural outwork and bulwark of our eastern empire, and it would, therefore, be difficult to over-estimate the importance of an accurate knowledge of its geographical features. Yet such knowledge as the zeal of British officers has been the means of collecting, has, in several instances been strangely neglected, while a large part of the area in question is still entirely unknown.

The map, a portion of which we reproduce, was compiled from original materials, in 1845, by a distinguished officer who served in the Afghan campaign. It contains much material, which has never been published in full detail, and still remains in manuscript. It will be the object of the present article to give some account of the existing materials whence a knowledge can be obtained of the region comprised in the basin of the Helmund.

A glance at the map will show the leading features of the Helmund catchment basin. At the north-eastern corner is the continuation of the Hindu-Kush range, called the Koh-i-baba, whence extend westward the two parallel mountain chains of the Safid-koh and Siah-koh, enclosing the lateral valley of Herat. The Safid-koh is the Paropamisus of the ancients. The distance between Herat and Kabul, which cities are nearly in the same latitude, is over 350 miles; and this space is occupied by lofty and rugged mountains, cut by deep ravines, containing the sources of the Helmund and its tributaries. Here dwell the wild Hazarehs and Eimaks, in a region covered with deep snow during the winter months, and affording pasture for cattle in the summer. There are records, preserved by Macartney, of Mahmud Shah and other Afghan princes having marched from Herat direct to Kabul. Eldred Pottinger travelled from Herat to Kabul, but north of the Hazareh country, and his route is not laid down on our maps, and General Ferrier made an unsuccessful attempt to penetrate across the mountains. No modern traveller has ever thoroughly explored the Hazareh region. It consists of the lofty ridges and peaks of the Siah-koh, and of the long spurs which confine the rivers in their upper courses, and gradually slope down towards the deserts of Persia and Baluchistan. The river Helmund is the leading feature of the region comprising the basin which bears its name as it divides it into two parts diagonally, and must be crossed by any force advancing from Herat to India. It is the only important river between the Tigris and the Indus. Rising in the Koh-i-baba, it flows in a south-westerly direction through the Hazareh country in a deep gorge for 260 miles, and then, emerging on the open country, it sweeps in a bold curve over the Garmsil (*Gurmsel* of the map), in a course of another 100 miles, and empties its waters into the Sistan Lake. On the western side of the Helmund, the drainage of the region is effected by three important streams, all with independent courses to the Sistan Lake, the Adraskan (*Rood-i-Subzawar* of the map), Furrah-rood, and Khash-rood. On the east side the various rivers, the Turnuk, Arghasan, and Dori (*Dohree*) unite with the Arghundab, the principal tributary of the Helmund.

The Helmund Basin is divided into two distinct regions: the mountainous gorges through which the rivers flow for at least half their courses; and the plain upon which they finally emerge, which sinks, in a succession of desert steppes, to the lowest depression at the Sistan Lake and its swamps. The mountainous region, with the exception of the routes taken by officers during the Afghan campaigns, is entirely unknown. The three roads from Herat to Kandahar skirt the foot of the mountain spurs, and have frequently been traversed by European travellers; and others have passed over the plain country of Furrah, Sistan, and the Garmsil in various directions.

Our earliest definite knowledge of the Helmund Basin is derived from the mission of Mountstuart Elphinstone to Afghanistan in 1808. The surveyor of the Mission was Lieutenant John Macartney, who was indefatigable in collecting geographical information, with which he compiled a valuable map and an excellent memoir; but this promising officer died before the publication of the first edition of Mr. Elphinstone's work in 1815. A portion of Macartney's Memoir is printed in an appendix to his chief's book; and the whole manuscript, a precious storehouse of information, is preserved in the Geographical Department of the India Office. Macartney's map was for many years the best authority for the countries on the north-western frontier of India.

Captain Christie was the first English officer to cross the Helmund. He was one of that able staff which did such splendid service during Sir John Malcolm's second mission to Persia; accompanying Pottinger in his journey through Baluchistan in 1810. On March 22nd Christie parted company with Pot-

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tinger at a place called Nushky, which has never since been visited, and took a north-westerly course over the desert to the valley of the Helmund, a distance of 190 miles. He reached the river at Pullaluk, where it curves round the Garmsil, before flowing northwards to the Sistan Lake. He crossed the Helmund near Rudbar, on the 31st of March, and again close to its mouth, without knowing it; and traversed the isthmus which then existed between the *Hamûn* or larger portion of the Sistan Lake, and the Duk-i-teer, or smaller basin, which received the Khash-rood. He thus reached Furrah, and travelled thence by Herat to Yezd. An abstract of Christie's journal forms an appendix to *Pottinger's Travels;* and a map showing his route was printed by Colonel Garstin, the Surveyor-General, in 1811. Christie travelled in disguise, and he took no observations for latitude or longitude.

The next Englishman who explored any portion of Western Afghanistan, was Edward Conolly, brother of the brave and accomplished officer who was afterwards murdered at Bokhara. Accompanied by Serjeant Cameron, Captain Conolly made an adventurous journey, in 1839, from Persia to India, by Herat and the Sistan Lake, which he was the first to describe with any precision, in his "Sketch of the Physical Geography of Sistan," published in the *Journal of the Asiatic Society of Bengal* (vol. ix., p. 710). He found that in 1830 a great inundation had entirely altered the face of the country as it was when Captain Christie traversed it in 1810. The main stream of the Helmund had deserted its old bed, and cut for itself a wide channel into the Duk-i-teer, the smaller lake at the north-east corner of the depression. This accession of waters then forced a communication between the Duk-i-teer and the main lake, breaking away the isthmus crossed by Christie. The lower or Dilaram road, from Candahar, by Girishk on the Helmund, to Furrah and Herat, skirts the foot of the mountains, whence a vast desolate tract stretches away to the westward, descending in steppes to Sistan, which is the lowest depression. It receives into its shallow swamps the whole discharge of this great inland river system. It has only one hill, the Koh-i-Khwajah, an island when the lake is full, which was visited by Conolly, in September, 1839, and by Major Lovett in 1872, (see *Ocean Highways*, for October, 1873, p. 279). The Hamûn (Hamoo of the map) is a Persian word, meaning a plain, level ground, or any expanse of water; and it is well applied to the depression which receives the Adraskan, Furrah-rúd, Khash-rúd, and Helmund. These rivers rush down with great violence during one period of the year, and are almost black with mud, while at others some are dry, and the others flow in clear shallow streams.

Conolly describes the effect of these periodical floods on the great shallow lake, which is not more than 4 feet deep. The water hurries away to the lowest spots, and there drops its loads of earth, until, in process of time, these low spots become elevated, and the water is driven off to some other place. Hence the levels are constantly altering, and the whole bed of the lake is gradually being filled up. The water, consequently, has a tendency to spread over a larger surface every year; layer after layer of deposit diminishes the slope, and nearly all the rivers overflow their banks on entering Sistan. But these natural causes are counteracted by irrigation works. Large bodies of water are drawn off in canals, flowing sometimes for 40 miles, through dry and sandy tracts; and massive bunds and embankments have been constructed, to confine the waters within certain bounds, for purposes of cultivation. Conolly found the lake of Sistan, in the vicinity of Koh-i-Khwajah, to be salt. Sir F. Goldsmid's officers reported it to fresh at the northern end. This is accounted for by their proximity to the mouths of its chief affluents, bringing down large volumes of fresh water. In the same way the water of the Caspian is fresh, even out of sight of land, near the mouth of the Volga.

Conolly's surveying work was executed by Serjeant Cameron, who was afterwards murdered in the Khaibar Pass, excepting the route across the desert from Sistan to Kala Bisht on the Helmund, which Captain Conolly himself sketched, as his companion was struck down with fever, and had to be carried on a litter. Conolly's map was published at the time in the *Journal of the Asiatic Society of Bengal*, and it was reproduced in the Quarter-master-General's Office at Simla, in 1872, on a scale of 8 miles to an inch. The original is at Calcutta.

At the commencement of the Afghan invasion, a large map of Afghanistan was prepared on a scale of 8 miles to an inch, in fifteen sheets. It is dated 1840. The materials for it, as regards the Helmund Basin, are Captain Christie's sketch of his route; Captain Conolly's map of Sistan; Sanders's route of the mission from Kandahar to Herat, and part of the Hazareh region from native information collected by Eldred Pottinger. The course of the Helmund is only given for a few miles above Girishk, and all the space between the Turnuk and the Helmund, east of Kandahar, is blank. This map appears to have been long unknown to map-makers in Europe, but there is now a copy of it in the Geographical Department of the India Office.

During the Afghan war the officers, who marched in many directions over a previously almost unknown country, were indefatigable in collecting information; and it is deplorable that so much of their material should never have been fully utilized. Major (now Sir Henry) Rawlinson was stationed at Kandahar, and, in the rare moments that he could snatch from his pressing official duties, he studied the comparative geography of the surrounding country. He also despatched his political subordinates on various missions, and their observations secured the accumulation of material for positive geography. Other officers were busy in the same field of research. In December, 1838, the present Colonel W. Fraser Tytler received orders to proceed to Afghanistan with the army of the Indus, as assistant in the Department of Colonel Garden, the Deputy Quarter-master-General. He remained in the country until December, 1842, when he returned in charge of the departmental duties of General Nott's force. He devoted the whole of his spare time to the collection of geographical information, both by executing surveys himself, by supplying officers who were sent on political missions with compasses and instructions for laying down their routes, and by obtaining copies of the work of engineers and other surveyors. The valuable materials thus amassed includes much that is hitherto unpublished:—

I. A detailed map of the country round Herat, between the meridians of 62° and 63° E., and the

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parallels of 34° and 35° N.; including Badkhys to the north, and Shafihân to the south. Badkhys, in the valley of the Murghab, is the most northern district of Herat, and is mentioned in Abbott's work; but is not shown as a district on most published maps. It is obviously a position of great political importance. This Herat map is from a survey by Captain Sanders and Lieutenant North, who accompanied Major Todd's Mission to Herat in 1839. The former, afterwards Colonel Sanders and Military Secretary, fell at the battle of Maharajpúr. General North is, we believe, still alive.

II. A route from Kandahar across the Argundab, and north as far as a place called Goonda, in the direction of the Helmund.

III. A survey of the district of Nesh, between the rivers Argundab and Helmund.

IV. About 50 miles of the course of Helmund, above Girishk.

V. Another 50 miles of the upper course of the Helmund, with a mountain tributary called the Khood, and some routes to the eastward. This takes the survey of the river to 33° N.

VI. The district of Teereen, and the courses of the Teereen and Gurumah Rivers, tributaries of the Helmund. The original sketch contains a great number of names, and other details not on the general map.

VII. The country on the right bank of the Argundab. to the east of Nesh.

The above are by Captain Sanders and Lieutenant North; but Colonel F. Tytler also went over the ground.

VIII. A survey of the river Bugran, a tributary of the Helmund, which rises in the Siah-koh, and joins the main stream on its right bank, a few miles above Girishk, by Lieutenant Cooper.

IX. A route down the Helmund, from Kila Beisht, at the junction of the Argundab, to Rudbar, including the whole country of the Garmsil, with the positions of thirty-two villages, and connecting Captain Christie's point at Pullaluk with Kandahar. This important piece of work was executed by Lieutenant Patterson, who was despatched on a mission in this direction by Sir Henry Rawlinson. Colonel Fraser Tytler supplied him with a compass and some instructions, and protracted the route on his return. Lieutenant Patterson was soon afterwards murdered by some mutinous troops at Kandahar.

X. A careful and detailed survey of the valley of Kandahar, by Colonel Fraser Tytler, down to the junction of the Argundab and Dori (Dohree). The latitude of Kandahar fixed by Captain Sanders at 31° 36′ 30″ N.

XI. The district of Kakrez, between the Helmund and Argundab, with much detail, especially on the right bank of the latter river.

XII. A route down the upper part of the valley of the Argundab, by General Lynch, which has never been embodied on any map.

In addition to all this material, the country to the eastward, especially the Guwal Valley, and the region of lake Abistadeh, was surveyed by Lieutenant Broadfoot; and partly by the Bombay force under General Willshire. The routes from Kandahar up the valley of the Turnuk, by Khilat-i-Ghilzi and Ghazni to Kabul; and from Kandahar, by Girishk, to Herat, were carefully surveyed, and are well known. But the valuable work of Lieutenant Sturt from Kabul to Bamian was unfortunately lost.

As soon as the Afghan was war over, Colonel Fraser Tytler, in 1845, with the rich materials that he had so carefully collected, began the compilation of a general map, and completed it in intervals snatched from arduous service, during the following two years. It is entitled:—"Map of the Western States of India, and of Afghanistan, including parts of Baluchistan and Turkistan, containing the last surveys made before the evacuation by the British troops of Candahar and Cabool: by Lieutenant William Fraser Tytler, Deputy-Assistant-Quartermaster-General of the Army." (Scale 16 miles to 1 inch.) The map extends from the mouths of the Indus to Bokhara, and from the Sistan Lake to the longitude of Delhi. This map, with the original surveys, is the most important geographical work connected with the Afghan war. With the cordial assent of Lord Gough, the Commander-in-Chief, and of Colonel Garden, the Quartermaster-General, who spoke most highly of its value, the map was forwarded to England, and presented to the Court of Directors, with a memoir, through Captain Tytler's father, who expressed "an earnest hope that it might be found an acceptable addition to the geographical knowledge of those countries." The sequel is almost incredible. The Court of Directors at first refused to accept the map, because it had not been received through the regular official channels!! Eventually a cold acknowledgment was given, and the portion of the new work, as given on Colonel F. Tytler's compilation, was embodied on a revised edition of Mr. Walker's map, which was issued in 1857. Fortunately Colonel Fraser Tytler recovered his materials again, on his return to England, or they would probably have been lost, as has been the fate of so many other equally valuable documents, previous to the formation of a Geographical Department at the India Office. Colonel Fraser Tytler has now deposited the map, and the original surveys on which it is based, in the Department; and no future map of Afghanistan can properly be published without using these materials, which have thus become accessible, after having been neglected for the last thirty years. We cannot but hope that the gallant officer who did so much for geography during the Afghan war, will feel satisfaction that his labours and the materials he collected will at last meet with the appreciation they deserve. There will now be a permanent record of his work, and of that of his brother officers, Sanders, Patterson, Cooper, and North; and their labours will be utilized by future geographers and map-makers.

We suspect that one reason for the neglect of Colonel Fraser Tytler's original materials was that the map of Mr. John Walker, the geographer to the East India Company (See *Ocean Highways* for May, 1873, p. 81), had already been published, and that they arrived too late. Walker's "Map of the countries on the North-West Frontier of India, compiled chiefly from surveys by Lieutenant Wood and Major Leech," appeared in 1841, and a revised edition was issued in 1857. The first edition contains none of the work we have enumerated as having been collected and embodied in the map by Colonel F. Tytler. We publish a lithographed copy of the portion of Colonel Fraser Tytler's map which embraces the basin of the

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Helmund, besides including Herat and Kabul. It will give an idea of the value and originality of this admirable compilation. But it is necessary to explain that the original sketch surveys, being on a larger scale, contain very much more detail than the map which embodies their main features. In a letter from Kandahar (*Royal Geographical Society's Journal*, xii., p. 114), Sir Henry Rawlinson wrote, in 1840, that "the accumulation of materials of positive geography is going on steadily and satisfactorily." He added, "I trust that the Indian Government will not delay much longer to display their treasures to the world." The delay has been continued to the present time; and, while some of these treasures have now been brought to light, others have been irremediably lost during thirty years of neglect and indifference.

After the Afghan war, General Ferrier was the first European to enter the valley of the Helmund. In 1845 he was at Herat, and he made a journey into the mountainous region of the Hazareh, visiting Zerni, the ancient capital of the Gour Dynasty (A.D. 1150-1214). He then took the upper road, along the skirts of the mountains from Herat to Girishk, and afterwards marched along the banks of the Helmund to Sistan. The General appears to have been engaged in a running fight with Baluchis, mounted on dromedaries, during this part of his journey, which gave him little time for geographical work. Ferrier, however, has added some names of villages on the right bank of the river. His original sketch-maps are in the Geographical Department of the India Office.

In 1857 Major Lumsden was at Kandahar, with Lieutenant Lumsden and Dr. Bellew, on a diplomatic mission; but, although they went by a new route and much valuable information was collected, their movements were jealously restricted, and little or no actual surveying work was executed. They returned to Peshawur in June, 1858.

M. Khanikoff, in 1860, made a journey from Herat to the south, as far as Lash-Jowain, near the northern shore of the Sistan Lake, and fixed several positions with considerable accuracy. He made a large correction in the latitude of Lash-Jowain, as laid down by Christie and Conolly, which indicated the further alterations that have since been made in the position of the lake by Sir Frederic Goldsmid's party. It is not, however, to be wondered at that Pottinger and Christie should have been so far out in latitude, when it is remembered that they travelled in disguise, often at night, and were unable to use any instruments but a watch and compass. Major Lovett, in 1872, made a survey of a portion of Sistan, which showed that the point where the waters of the Helmund are diverted for irrigation is laid down, on Mr. Walker's map of Afghanistan, 20 geographical miles too far north; and the furthest south point reached by the Helmund about the same distance. Major Lovett's survey extended to a point not very far from Rudbar, the furthest point reached by Lieutenant Patterson from Kandahar, in 1840. The small interval can be satisfactorily filled from the notes kept by Sir Richard Pollock and Dr. Bellew during their journey from Kandahar to join Sir Frederic Goldsmid's party in Sistan.

Sir Richard Pollock left Kandahar on the 13th of February, 1872, and reached Rudbar on the 20th, travelling along the banks of the Helmund. The river banks are fringed with an almost continuous succession of villages, corn-fields, and gardens; while to the south all cultivation is bounded by the billowy surface edge of the desert. The river was at its lowest, but the bed was 300 yards across, and there must be a magnificent volume of water when the stream is full. At places the cliffs of the desert come close to the river, at others they recede and leave a wide expanse of pasture and cultivation, while thickets of reeds and tamarisk, abounding in wild hogs, line the banks of the river. Although Sir Richard Pollock took no astronomical observations, his diary was very carefully kept, and his bearings and distances satisfactorily connect the work of Patterson with that of Lovett.

These brief notes of previous travels in the valley of the Helmund, and of the geographical material that has been collected, show that a new map of Afghanistan, containing fuller and more accurate details than are to be found on any that has hitherto appeared, might now be published. The want of any uniformity in the transliteration of names is also a crying evil, as regards all existing maps. Our remarks also show that very much remains to be done, and that a large area is yet unexplored. It comprises a region which, as Sir Henry Rawlinson wrote from Kandahar in 1841, presents a noble field for comparative geography, while its physical aspects are not less interesting and important.

Political considerations will probably lead to a more thorough examination of Western Afghanistan before very long; for its strategical position, natural strength, and the warlike disposition of its inhabitants, seem to fit it, in friendly hands, to become the outwork and bulwark of Hindostan. With this view, Lord Lawrence established the present ruler on the throne of Afghanistan, by assisting him with large presents of arms and money, and the same policy was persevered in by Lord Mayo, with most satisfactory results. The Amîr Shîr 'Aly declares himself to be our ally and dependent, that our enemies are his enemies, that he would be glad to have his army instructed by us, and his strong places and communications improved under our direction. A well-trained and friendly Afghan army could be of the greatest service to the Government of India; and it only remains to complete the policy adopted by Lord Mayo, at Ambala in 1869, to secure this result. The fort at Girishk, on the Helmund, between Herat and Kanhadar, and commanding the roads, should be strengthened; as well as the forts at Furrah and Lash-Jowain. They could be made very formidable at a moderate outlay, and a few hundred miles of improved commercial and military roads would well repay the cost. It would be an advantage too, with a view to maintaining a close alliance, that the relations between the Indian and Afghan Governments should be more intimate. Since 1856 we have had a native agent at Kabul, and a news-writer at Kandahar. But it is a political necessity that the topography and statistics of countries which are the fields of our diplomatic efforts should be studied; and it is most important that a British agent should be deputed to Kabul or Kandahar. If this is done, and if English officers hereafter instruct the Amîr's army and superintend his military works, the basin of the Helmund will be thoroughly explored, and a complete geographical knowledge will at length be acquired of Western Afghanistan.

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CAPTAIN PRSHEVALSKI'S TRAVELS IN MONGOLIA.

Staff-Captain N. M. Prshevalski, of the Russian army, known for his previous explorations in the Amur and Ussuri country, left St. Petersburg in August, 1870, with the intention of exploring Mongolia and Tibet, and, if possible, entering India by way of H'Lassa and the Eastern Himalayas. Although he has failed in this latter part of his scheme, he has acquired most valuable scientific information which, combined with the map he intends shortly to publish, will shed a flood of light on the geography, zoology, and botany of Mongolia and Northern Tibet.*

He commenced on the 25th of February, 1871, by making a preliminary journey to lake Dalei Nor, by way of the town of Dolonor, which lies 150 versts south of it. He then returned to Kalgan, which he reached on the 24th of April. During this excursion he made height observations, especially in the mountains north of Peking which fringe the great Mongolian plateau, and arrived at the conclusion that the lofty Petcha Mountain of Ritter had no existence. At Kalgan he commenced preparations for his great journey.

On the 3rd of May (o.s.), 1871, Captain Prshevalski and his fellow traveller M. Pyljzov, accompanied by two Cossacks, a trusty greyhound called "Faust," and with an equipage consisting of eight camels and two horses, set out from Kalgan in the direction of the Ordos country. The greater portion of the baggage consisted of guns and ammunition, as they knew that in some districts the unfriendliness of the Chinese, and in others the devastation effected by the rebellion of the Tungans, would oblige them to depend on their own guns for supplying food. The road lay in a south-westerly direction about 80 versts to the north of Kuku-choto. When about 100 versts distant from Kalgan, they fell in with three Belgian Catholic missionaries, who greeted them most warmly. In the same remote village they met Samdachemba, the old guide of Messrs. Huc and Gabet, in 1844. He is fifty-five years of age, but recalled several incidents of his journey with those energetic missionaries to H'Lassa; and Prshevalski would have fain persuaded him to accompany them now, but the old Chinese said he was too far advanced in years for such a journey.

Once out of the main route to Kiachta, the face of the country changes: the mountains grow loftier, rocks occur more frequently, and the soil, half loam, half sand, bears less grass, the plentiful water supply to the north of the Kiachta route disappears, and the valleys merge into dreary steppes. Sandy and stony beds of streams there are, but these are only filled during the rainy season, while wells are scarce, and the Chinese jealously occupy every valley likely to prove fertile. Year by year, as cultivation advances, the Mongolian shepherds and their flocks, and the fleet antelopes, are driven further northwards in the direction of the Great Gobi desert.

The highest mountains passed by the travellers were the Shara-chad and Suma-chad, under 6000 feet in height, and frequented by wild sheep (*ovis Argali*), who, however, belied their character by their great tameness.

The "merrie month of May," in these regions proved anything but genial. Continual gales of wind and morning frosts held on till the middle of the month, and on the 24th and 25th there was a violent snowstorm. This in a country forty-one degrees north of the equator—the latitude of Naples—naturally strikes a stranger with astonishment. It retards the crops, sowing usually taking place about the end of May or beginning of June.

Towards the end of June the Inshan was reached, a high and steep mountainous mass, from 25 to 30 versts in breadth, rising from the left bank of the Hoang-Ho. It differs essentially in character from the other mountain ranges of South-Eastern Mongolia, being in many places covered with timber, abounding in water, and with its numerous ravines, rocky aspect, and steep, difficult paths, presenting a decidedly Alpine appearance. The loftiest peak attains a height of about 7400 feet. But the vegetation is poor compared with that of the Amur and Ussuri; the trees are chiefly birches, willows, and aspens of stunted growth; while the only shrubs form a sort of underwood in the forests, or else are met with in the dried-up beds of brooks.

The Inshan is important, zoologically considered, as forming a distinct boundary line for some kinds of mammals and birds. The commonest animals are the wolf, fox, a species of elk, the roebuck, and the antelope. The feline race is conspicuous by its absence, though native tradition speaks of the panther and tiger as former denizens of the country.

Bautu was the first town of importance after leaving the Inshan range. It lies about a verst north of the Hoang-Ho, and 50 versts from Chagan-Kurenj; it is built in a square shape, with earthen walls, and does a good trade with Mongolia. During their sojourn in the town, the travellers were subject to great impertinence from the Chinese, whose curiosity knew no bounds. The behaviour of the Mongolians was, on the other hand, of a friendly and sociable character. Here the river Hoang-Ho was crossed in ricketty boats, just as Messrs. Huc and Gabet describe in their travels. Continuing their journey along the banks of the stream for a distance of 434 versts as far as Dyn-chu (marked Chagan-Subarkhan on the maps), Prshevalsky and his companion arrived at the conclusion that the great Yellow River had recently materially altered its course, and that it is thus of course wrongly shown on the maps. This (as all our information respecting the stream proves) is a process which has been going on for ages, and now the river actually flows 50 versts to the south of its ancient bed. Continual quarrels between the Ordos and Urots was one result of these great physical changes. A Commission from Peking was appointed to settle the disputes, and they decided that the Ordos country should, as of old, extend as far as the old bed of the stream, and at this day the existence of Ordos divisions of territory on both sides of the Yellow River attests the truth of this traditional history.

The southern bank of the Hoang-Ho and its adjoining lands are principally meadows well adapted for culture; the population was quite recently very dense, and large herds of horned cattle were reared there. But the irruption of the Tungans in 1869 caused the

* A Map of Mongolia and the Desert of Gobi in the June number of *Ocean Highways*, 1873, shows a portion of Captain Prshevalski's route.

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inhabitants to flee, and the cattle have become in consequence as wild as the antelopes. Four of these semi-wild bulls fell victims to Prshevalski's Lancaster rifle; and he says he could scarcely credit the fact of the domestic ox having developed into the quick, nimble, and light-footed beast before him.

Parallel with the course of the Hoang-Ho, and at a distance of from 20 to 25 versts from the right bank, there stretches for about 350 versts up stream a strip of sandy waste called Kusuptchi extending as far as Alächan. This fine sand-drift by the action of the normal winds is blowing into long ridges into which man and horse sink knee deep. In this melancholy, silent region, so the Mongol story goes, two great warriors Gesser-Khan and Chinghis-Khan once fought, and many Chinese were slain. But at God's command arose a mighty west wind, which enshrouded the corpses in sand, and now nothing is heard throughout that dismal waste save a sound of cry and lamentation.

The height of the valley of the Hoang-Ho by Bautu (measured by boiling-point thermometer) was 3320 feet, and 27 versts westward of Dyn-chu it was 3458 feet. This gradient is too slight to account for the swiftness of the stream, which flows at the rate of about 300 feet a minute. Beyond the valley of the Hoang-Ho the Ordos country is now very sparsely populated. Footpaths are overgrown with weeds, and here and there a partially destroyed village meets the eye, all attesting the ruins effected by the Tungans.

In travelling through the Ordos country the heat experienced by the travellers (it being from July to September) was most oppressive. This summer heat comes very late in the year, for the last snow fell on the 3rd of June; but, accompanied as it is by plentiful rainfall, it ripens the corn with such marvellous quickness, that it is usually cut by the end of July.

Crossing the Hoang-Ho for the second time, close by the town of Dyn-chu, the desolate land of Alächan was reached, some parts of which possesses a peculiar vegetation, the chief examples of which are the *Sak*, a tree about 10 or 12 feet high, with soft, hanging branches destitute of leaves, which afford forage for camels, while the stem is used for fuel; and the *Sulj-chir* grass, which blooms in August, the small seed-pods of which when bruised afford a species of meal, which, eaten with butter, is very good food. This *sulj-chir* is also met with in the Ordos country, and, according to Mongol report, in the desert of Gobi. Ravens, sparrows, larks, and swarms of *Syrrhaptes* (the Barguerlac of Marco Polo) frequent the Alächan country.

After twelve days' journey, Dyn-yuan-yin, the capital (height 4826 feet), was reached, a town which on their maps appeared as Wei-tchin-pu. For the first time for ten months Prshevalski and his companions received a hearty welcome. The Prince and his sons sent them constant presents of fruit, and a sugar-loaf which had come by way of Kiachta. They eagerly questioned the travellers about Europe, its people, telegraphs, railways, and other wonders; and were convinced that France and England could not but be dependent States of Russia.

About 20 versts distant from the town are the mountains of Alächan, which rise suddenly close to the margin of the Yellow River, but gradually diverge so that the axis of the range runs N.N.E. and S.S.W. and the southern end is 100 versts distant from the river. The barren waste of Alächan on the west, and the valley of the Hoang-Ho on the east, define sharply the limit of this mountain range. While on its northern face it widens out considerably, towards the southern extremity it narrows to a breadth of from 25 to 30 versts; the total length of the chain, according to the Mongol accounts, being about 240 or 250 versts. On the eastern side the range abuts abruptly on the plain in huge rocky walls, between 800 and 900 feet in height. The highest peak in the Southern Alächan is called Bayan-zumbur, and attains an altitude of 10,650 feet. The vegetation, which consists mainly of firs, pines, aspens and underwood, extends as far upward as 10,000 feet above sea level, and the animal life frequenting the woods embraces the elk, a species of horned sheep, and, according to native report, the sable; among birds, the long-eared pheasant, lammergeier, king vulture, magpie, and crow are common.

On the 15th of October, after a fortnight's sojourn in these mountains, and while still 600 versts from Kuku-Nor, Prshevalski and his party were forced to retrace their way to Dyn-yuan-yin and Peking. They had been unfortunate enough to have all their camels stolen from them north of Kuku-choto; and, in addition to this, they had lost eleven horses, so that their resources were drained in an unforeseen manner. Their return was by way of the Urot country north of the Hoang-Ho. This country is separated from the Mongolian plateau by a mountain range, without any distinguishing name, which extends parallel to the course of the Yellow River, at a distance of from 50 to 60 versts from it, and which does not run as shown in the maps, but is divided from both the Inshan and Alächan ranges by extensive plains from 100 to 200 versts in extent. This mountain range forms a remarkable line of demarcation between two distinct climates, that to the south being much the milder. Not a single Mongol was met with in these parts, for the Urot inhabitants had all fled before an invading band of Tungans from Amdo to the south of Kuku-Nor. But the Tungans are pitiful cowards in the presence of Europeans, four well-armed Russians sufficing to keep off nearly a hundred of these undisciplined rabble.

In the early part of June, 1872, Captain Prshevalski again set out from Dyn-yuan-yin, this time in company with a Chinese caravan, and after a month's travelling, reached the Pagoda of Chebsen, 60 versts north-east of the town of Sinin. Here the party were in the heart of the Tungan rebellion. Sinin was in the hands of the rebels, as well as some smaller places, while the surrounding country had been laid waste by their marauding excursions. A great battle had been fought, on the 6th of August, between them and the Chinese, but with an indecisive result. But in spite of all this the Russian party were quite safe, for their reputation, and that of their fire-arms, had spread far and wide, and had even caused the Captain himself to be looked upon as invulnerable.

On the 23rd of September, 1872, the party left Chebsen, and travelled by way of a mountain path between Tetun and Sinhuan, through the heart of the Tungan country towards Kuku Nor. A marauding

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band of Tungans was encountered on the way, but these were completely overawed by the determined attitude of the Russians, who with their revolvers and carbines all ready, calmly proceeded on their way. The Tungans retreated, and no further opposition was offered as far as Kuku-Nor. This beautiful lake was reached on the 14th of October. It lies about 10,000 feet above sea level, is surrounded by fertile plains, frequented by numerous herds of antelopes, while snow-capped mountains lend a picturesque background to the view.

After crossing a lofty range, which rises south of the lake, and extends westward for about 600 versts, they entered upon a marshy country called Chaidam, at no very distant period the site of some large lake. This lowland is bounded on the south by the Burkhan-Buda Range, and westward is said to stretch away to Lob-Nor. It abounds in wild camels, but Prshevalski was too short of money to organize a hunting party to pursue them further. Through the middle of the Chaidam country flows the river Bayangol, about 400 versts long, and of tolerable breadth. The surrounding plains are about 1000 feet lower than the Kuku-Nor Lake, and are of course warmer. The fauna of Chaidam is poor, but ten new species of birds were discovered about Kuku-Nor.

On the 20th of November they reached the foot of the Burkhan-Buda chain, which abuts on the cold, sterile plateau of Northern Tibet, which to the south, as far as the Tanla Range, attains the height of from 14,000 to 15,000 feet. Above this lofty table-land tower two great mountain chains, the Shuga and Gurbu-Naidchi, the latter forming the commencement of the Kuen-Lun. Prshevalski travelled as far as 50 versts eastward, and after crossing the lowlands of Bayan-Khara-Ula, at last came upon the Upper Yang-tsze-kiang, or Murui-ussu, as it is here called, about 100 versts south of the Kuen-Lun.

Here, on the banks of the Blue River, about twenty-seven days' march from H'Lassa, Prshevalski, though loth, had to turn back. The storms, cold, and scarcity of fodder, had reduced his eleven camels to three, which had barely strength to put one foot before the other. Their money was exhausted, and even with it, it would have been impossible to have procured any beasts of burden, as Northern Tibet is almost uninhabited, from the Burkhan-Buda to the southern slope of the Tanla Range, a distance of 800 versts.

During their travels they had met many herds of yaks, gazelles, antelopes, and mountain sheep, and discovered a new kind of *mufflon*, which, from never having been hunted, was excessively tame. The yaks which Prshevalski shot were formidable creatures, and recall Marco Polo's description of the beast; one skin measured 14 feet from the nose to the tip of the tail. Their strength is very great, and their vitality extraordinary, considering that Prshevalski lodged eighteen bullets in one yak before it was killed, and three went into the head without, however, penetrating the brain, which in these animals is extremely small and surrounded with a thick casing of bone.

The high level of Tibet made breathing a difficult matter for the travellers, especially when in quick motion. There was, however, no trace of a deleterious coal-gas on the Burkhan-Buda, as Messrs. Huc and Gabet describe. Indeed, in several points, Prshevalski (in common, it may be observed, with other geographers) finds the worthy Abbé's accounts most unsatisfactory. For instance, Huc says nothing about the lofty mountains south of Kuku-Nor, which he must have passed close to, and he mentions, without further notice, the river Bayangol in Chaidam which is twenty times the size of the Bukhaingol, the difficulties of crossing which he enlarges upon. Many other instances are quoted by Prshevalski, which strengthen the notion that their accounts could not have been written on the spot.

Having passed the months of April and May in studying the flora and fauna of the Kansu Mountains, Prshevalski returned to Dyn-yuan-yin on the 15th of June, having collected more than a thousand species of birds, skins of forty large animals, and of more than a hundred smaller, and four large chests filled with botanical specimens. Observations for latitude had been made at the mouth of the Bukhaingol, on lake Kuku-Nor, at the foot of the northern slope of the Burkhan-Buda and on the Murui-ussu. His forthcoming map will embrace the whole extent of country between Lake Dalai-Nor and the upper Yang-tse-Kiang, as well as show his route survey from Dyn-yuan-yin to Urga.

Some details respecting the ethnology of the countries visited are given by Captain Prshevalski. He came across four races—pure Chinese and Dalds; a mixture of the Mongols and Chinese, in Kansu; pure Mongols in Kuku-Nor and Chaidam; and Tanguts, a very low race, in Kansu, Kuku-Nor, and Chaidam.

On this subject, the archimandrite Palladius remarks that the Tanguts are divided into two races, called yellow and black; the former live mainly in lowlands, and are gradually disappearing beneath Chinese encroachment; the black Tanguts are mountaineers, and live by pasture. The Muhammadans, who are to be found in Kansu, have chiefly come from Bokhara by way of Chama, Turfan, and Lutkchin. The Salar, a peculiar tribe of the Tangut race, are characterised by great fanaticism, and formed the nucleus of the Tungan rebellion, the Tungans themselves being mostly found in Kansu. Palladius remarks further that Prshevalski is the first European who has conveyed to us a correct notion of the structure of the Eastern Kuen Lun, and that his theory agrees exactly with that of Chinese geographers, who, it may be observed, deny the existence of any connection between the Eastern and Western Kuen-Lun.

In conclusion, it should be mentioned that the Russian Geographical Society have published a Chinese itinerary* from Urga to H'Lassa, compiled by the members of an ecclesiastical mission despatched to the grand Lama of Tibet for the purpose of procuring his sanction to the election of a Buddhist *Kutuchta* or priest of Urga. The mission after having been put off from year to year on account of the disturbances in Kansu and southern Mongolia, finally started on the 24th of March, 1873, and the details have been collected by M. Shishmaref, Russian Consul at Urga. The itinerary goes by way of Alächan and Kuku-Nor, in part coincides fairly with Huc's, and admits of being incorporated into our maps.

* Reproduced in *Petermann's Mittheilungen*, No. II. of 1874.

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THE HYDROGRAPHICAL DEPARTMENT OF THE ADMIRALTY.

As changes have lately taken place in the Hydrographical Department of the Admiralty by the retirement of Rear-Admiral George H. Richards, C.B., F.R.S., from the onerous duties of Hydrographer, and the appointment of Captain Frederick J. Evans, C.B., F.R.S., to succeed him, we propose to give a brief history of this important branch of our naval service, and, it may be added, of the naval services, both imperial and mercantile, of every maritime country in the world; and also to add a sketch of the labours of the department.

By an order in council dated the 12th of August, 1795, the great inconvenience constantly felt by the officers of the fleet, "especially when ordered abroad, from the want of sufficient information respecting the navigation of those parts of the world to which their services may be directed, and with which they are sometimes totally unacquainted," led to the consideration of the means most advisable for preventing the difficulties and dangers to which His Majesty's ships were exposed from any defect on this head. For the purpose of taking charge of such plans and charts as belonged to the Government, and for selecting and compiling information, it was proposed that a proper person should be fixed upon to be Hydrographer to the Board of Admiralty, and—mark the item—the additional expense to the crown was not to exceed 470*l.* per annum.

The first hydrographer was appointed the same year in the person of Alexander Dalrymple, a gentleman then holding an appointment of the same nature under the East India Company. An assistant was also appointed, and shortly after, the Messrs. Walker, the well-known map engravers, became connected with the department, and preserved that connection until within the last few years.

Surveyors existed before the time that a hydrographer was appointed to direct them; and the surveys of the immortal *Cook*, and those of *Lane* and *Gould*, *Des Barres* and *Holland*, of the shores of the East Coast of North America and our British possessions of Newfoundland and the present dominions of Canada, testify to the present day the natural abilities and the scientific acquirements of our earlier surveyors. To these must be added *Vancouver* in North-West America, and *Hurd* in the "vexed Berrmuthas." These were all "Admiralty" surveyors.

Previous also to the appointment of Mr. Dalrymple as hydrographer, a survey of the Orkney Islands had been commenced by Professor Mackenzie, in 1750. He was then in no way connected with the Admiralty, but he was afterwards employed by that Board in the survey of the Shetland Islands. The Professor was succeeded by his nephew, Lieutenant Mackenzie of the Royal Navy, who continued the survey and extended it to parts of England and Ireland as well as Scotland.

At that period surveying, as a science, was not well understood; the instruments then in use were rude in comparison with those of the present day, and the observers may be considered to have been as rude as their instruments; and as those who directed their labours were entirely ignorant of the nature of the work, they were satisfied with quantity without due regard to quality. Consequently the surveys were imperfect, carried out as they were in a loose and hurried manner. Still, if due consideration be given to all the circumstances, the wonder is how they were done at all.

The mantle of Lieutenant Mackenzie descended on a relative who had served some time with him as an assistant. Mr. Graeme Spence was a civilian, but a vessel, commanded by an officer of the Royal Navy, was furnished him to carry on his survey. Mr. Spence,* and we may say Mrs. Spence, executed some of the best of our old surveys. They extended along the south coast of England and Scilly Islands, the Downs, and entrance to the Thames. Strange to say, that although Mr. Spence continued surveying for the Admiralty for nine years after the Hydrographical Department was constituted, it does not appear that he was ever directly connected with it. On his retirement, in 1804, the Trinity House awarded him 50*l.* a year in consideration of the services he had rendered to the navigation of the river Thames, by the discovery and survey of several new channels at the entrance.

The connection between the Admiralty and its surveyors was at this time ill-defined. They were employed by the Admiralty, but were not naval officers. They were bound to deposit their original surveys at the Admiralty, and yet were permitted to publish for their own special benefit. They even disposed of the copyright of their works to private publishers, which were afterwards re-purchased when the Admiralty decided to publish their own charts for the navy.

Mr. Dalrymple had been ten years in his position of hydrographer, and yet the principal object for which the appointment was made, viz., the efficient supply of charts to the Royal Navy, had in no way advanced. It was not that Mr. Dalrymple had been idle in his department, for he was a man of undoubted ability and vigorous intellect, and, as a Fellow of the Royal Society, he ranked high among the scientific men of his day. Indeed he was offered the charge of the expedition to observe the transit of Venus in 1768, afterwards entrusted to Captain Cook; but as he found he could not be allowed to assume the rank and command of a naval officer, he declined the appointment.

Mr. Dalrymple conceived that he would be best fulfilling his duty by compiling and engraving, without commencing any regular supply to the navy, with the idea of first completing sufficient for all purposes of navigation; thus the "steed was starving while the corn was growing." This delay produced impatience in their Lordships, and also an order to the hydrographer to supply charts to the navy from his own department, supplemented by purchases from private firms. This order caused the hydrographer to appeal to the Board for the appointment of a committee of officers to consider how their Lordships' orders could be best carried out, and a committee, consisting of Captains Sir Home Popham, Columbine, and Hurd, was nominated for the purpose. One of the results of this step was, that Captain Hurd succeeded Mr. Dalrymple as hydrographer. Mr. Dalrymple was called upon to resign by Lord Mulgrave. He declined

* Mrs. Spence greatly assisted her husband in his surveys, as she was an admirable draughtswoman.

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to do so, and was summarily dismissed on May 28th, 1808. On the 31st, he published *The Case of A. Dalrymple*, bitterly complaining of the treatment he had received. It broke the old man's heart, and he died on the 19th of the following June.

Previous to the dismissal of Mr. Dalrymple, Captain Horsburgh, who had been employed for thirty years in India, offered the MS. of his East India Directory, with charts to accompany it, to the Admiralty, and also to the East India Company, on condition that they should be published for the benefit of navigation. But such was the short-sightedness of both departments that, after inspection, the offer was rejected on the plea that the work was too voluminous for them to undertake. The Directory was afterwards published by the worthy Captain himself, and with what success is well known.

Captain Hurd succeeded to the post of hydrographer in 1808, and on his accession some additions were made to the staff. It being war time, the energies of all were severely taxed; the draughtsmen worked early and late, Sundays as well as week days; manuscript charts had to be prepared for various expeditions, at short notice, and lithography was not at hand to aid them. From this time charts were regularly issued to the navy, arranged to the requirements of the station each ship was on. These were either published by the Admiralty or purchased, but the efforts of the hydrographer were directed to rendering the Admiralty independent of supplies from without.

A large addition was made to the stock of Admiralty engraved plates by the sale of the private collection belonging to Mr. Dalrymple, by auction. They had previously been offered for sale to the East India Company and Admiralty, but declined. They were now secured to the Admiralty, through the exertions of Mr. Walker, to the number of 130.

In the year 1810 the Admiralty had no surveyors employed. The only one who for some time had been so employed, Captain Flinders, was confined in a French prison at Mauritius. It was at this time that the Admiralty first conceded to the hydrographer the privilege of selecting a surveyor, which was followed by the selection of others, and from that period the hydrographer has continued to nominate all surveying officers. The union of the surveying service with the Hydrographical Department, with the hydrographer as practical head of both, may then be considered to have been accomplished. Mr. George Thomas, a master, was appointed for home surveying, and shortly after, Commander Francis Beaufort was sent to the Mediterranean to examine the coast of Karamania. Lieutenant William H. Smyth was also sent to the Mediterranean for surveying duties, but he was ordered to "make bricks without straw," for no vessel was provided, to enable him to carry out his duties. Fortunately, he became attached to the Sicilian flotilla, commanded by Sir Robert Hall, who furnished him with means to prosecute his labours. In 1813 Messrs. Lockwood and de Mayne, masters in the navy, were added to the surveying service, and employed in the West Indies and on the American coasts.

At the close of the war, in 1815, further additions were made to the surveying service, and men, whose names are now as "familiar as household words," began to appear in connection with it. Such were Hewett, Martin White, Owen, Bayfield, Madge, Vidal, and others.

Captain Hurd died in 1823. To him we are indebted for the establishment of an acknowledged surveying service, composed exclusively of naval officers; and although it was then in a crude state, it was the commencement of what we now find to be of so much importance, viz., the systematic education of young officers, who in succession would command surveys; for without this system the charts produced would naturally greatly diverge and differ from each other.

For some years after the conclusion of peace in 1815, the Government was extremely anxious to prevent foreign powers, with whom we had been waging hostilities, from obtaining possession of the charts published, as the success of naval operations on coasts much depended on the correctness of the charts, and their use was confined as much as possible to His Majesty's ships. But before Captain Hurd died the restriction was removed, and the use of charts, so jealously guarded, was thrown open to the mercantile or any other navy.

At the time of Captain Hurd's death the whole control of the department had drifted entirely into the hands of the well-known Secretary of the Admiralty, John Wilson Croker; and it is very certain that that potentate held the department in no very great esteem, for although there were naval officers fully competent to fill the post of hydrographer, none was appointed for more than two years. During this time it was left to the charge of Mr. Walker, who, although a most efficient man, was not in a position to secure efficiency. The department, from the neglect of the higher authorities, retrograded to a low ebb, and the officers who at the time were preparing their surveys for publication, suddenly got their dismissal; and their surveys, collected and drawn at a great expense to the country, were shelved on the plea of economy.

In 1825 Sir Edward Parry, who had distinguished himself in his North Polar voyages, was appointed hydrographer, and he succeeded in getting two lieutenants, Becher and Sheringham, attached to his staff for the purpose of compiling nautical directions to accompany the charts. In 1827 Sir Edward Parry assumed the command of another North Polar expedition, and Mr. Walker was again left in charge. On the return of Sir Edward Parry he resumed his position as hydrographer. During his absence, the Duke of Clarence had become Lord High Admiral, and on the deplorable state of the department being represented to him, he took active measures by the appointment of draughtsmen, to prepare the shelved surveys for engraving; but on the retirement of His Royal Highness the same causes that proved so prejudicial to the department before, were again in operation, and, finding he could not conduct the duties with advantage to the country or credit to himself, Sir Edward resigned the appointment.

Captain Francis Beaufort succeeded Sir Edward Parry in 1828, and from his appointment may be dated the commencement proper of the department. This may be said without prejudice to his predecessors, inasmuch as opportunity was not afforded them to organize it. Captain Beaufort was not only a scholar but also a practical and scientific surveyor, and from his extended

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experience he knew the requirements of the seaman and the navigator. He also knew that those requirements had not been met, and that the state of the charts was such that but little dependence could be placed on them, and he saw that if any radical improvement was to be made in charts in general, it would devolve on this country to carry those improvements into effect.

Captain Beaufort was truly a business man, punctual and assiduous to a degree. He possessed that rare power of discernment which enabled him to judge of men; and in his selection of officers to command surveys he generally succeeded in securing the services of those who carried out his views most zealously.

From being a mere adjunct of the Admiralty, in 1831 the office was formed into a separate department, framing its own estimates and, under the sanction of the Board, arranging its own work.

In 1854 Sir Francis Beaufort retired, having for nearly a quarter of a century laboured in the department he so worthily presided over, and so much was he esteemed, that those of the Surveying Service, and others who knew his worth and respected him, combined to do him honour by having his portrait painted and engraved, and also by establishing the Beaufort testimonial, which is now an object of ambition to attain by the junior officers of the navy, when passing their college examination in the higher branches of mathematics. The original portrait is appropriately placed, with those of many another gallant officer, in the Painted Hall at Greenwich.

During Captain Beaufort's administration, surveys were organized in the Mediterranean, and on the coasts of Africa, South America, Australia, New Zealand, and China; whilst the coast surveys of the United Kingdom were prosecuted with increased vigour; and, in addition to these, the various Arctic expeditions received their instructions prepared by his hand.

In Captain Washington the Board found a worthy successor to Sir Francis, a man full of energy and enthusiasm, of wide and enlightened views, of great perseverance and industry. Captain Washington had, since the commencement of the late war with Russia, been assisting the hydrographer, and thus had a previous knowledge of the working of the department, before he took the reins into his own hands. Captain Washington's energy was soon conspicuous in the number of charts published, the further prosecution of foreign surveys, and in his endeavours to complete the surveys of our own coasts. He also successfully directed his efforts to the greater circulation of the Admiralty charts among the mercantile marine of this country; and although it does not at first sight seem right on the part of Government to compete with private publishers in the sale of charts, it must be remembered that the said publishers obtained their data from the Admiralty charts, and as the latter are considered the best authority, in the interests of navigation and commerce, it is the duty of a government to sanction the promulgation of the best, as best insuring the safety of lives and property.

Captain Washington may be said to have fully sustained the high character of the department attained by his predecessor: he died a Rear-Admiral in 1863. On the abolition of the Indian Navy, in the year previous to Captain Washington's death, the valuable charts and documents collected by the East India Company were transferred to the Admiralty, and the duties connected therewith, hitherto performed by the Company's officers, were transferred to the Hydrographical Department of the Admiralty.

Admiral Washington's successor, Captain George Henry Richards, was, at the time of the Admiral's death, on his way home from a foreign survey, and on his arrival in England he at once assumed the post of hydrographer. It would be invidious to enter into details of his labours in the department; but he undoubtedly has done much to increase its efficiency, and also to raise the dignity of the department to what—as one of the most important branches connected with the Naval Service of this great maritime nation—it should be. He soon discovered that the staff was quite inadequate to cope with the increased and increasing requirements of the day; the number of charts and books had so multiplied, both requiring constant revision, that it was difficult to keep up the current work, and at the same time to produce more. On clearly stating the case, two additional naval assistants were allotted, which greatly relieved the strain on the department. By Captain Richards's exertions the whole department was placed on a better footing, and the transfer of the Harbour Board to the Board of Trade, which occurred before he took office, afforded more space, which was greatly needed; but even as it is, the want of room for the proper conservation and arrangement of the numerous and valuable—nay invaluable—documents connected with the department, is very great, and has more than once been the subject of comment in the House of Commons. That such a state of things should exist, is a disgrace to this great nation. At the Dépôt des Cartes, in Paris, a greater amount of space is allotted to the British charts alone than the English Admiralty affords for the charts of the whole world. Many proposals have been made to rectify this state of things, and even at times to remove the department from the Admiralty, but the necessity of constant reference precludes the latter being done; and not until a new Admiralty be built can the present inconvenience be remedied.

Captain Richards directed his attention to the production of physical charts, so greatly needed, and of such vital importance to the navigator. The mass of information awaiting this process was enormous, and the tedious task of digesting and summarizing it, and applying it when thus arranged, has been most successfully accomplished by Staff-Captain Evans and Staff-Commander T. Hull, two of the Naval Assistants. It is therefore not too much to say that the physical charts published by the Admiralty have given a greater impetus to the knowledge of the causes and effects of winds, currents, and temperatures than any publications that have preceded them. They have already been reproduced in France and other countries.

It would be impossible in an article such as this to do full justice to ten years of assiduous progress in this department, the more so as the officer who has so lately resigned the position of hydrographer is still with us. His unremitting attention and devotedness to his duties told on his health, and obliged him to resign the post he so worthily filled.

We now proceed to give a sketch of the constitution and working of the department, and of the present state of our surveys.

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The Hydrographic Department of the Admiralty is composed chiefly of naval officers; and consists of the Hydrographer, seven naval assistants, who are borne on the books of one of Her Majesty's ships, one civil assistant employed on pilotage duties, a writer, a superintendent of compasses and assistant, a superintendent of charts, six draughtsmen, and four packers of charts and messengers—twenty-four individuals in all. The expenses of the department are provided for under Vote V., which comprises the Hydrographic Department at Whitehall, the surveying service afloat, the observatories at Greenwich and the Cape of Good Hope, the nautical almanac establishment, and other minor branches of the scientific service. The total grant for this branch, under Vote V., was 120,357*l.* in 1861-62, and only 107,790*l.* in 1873-74. The vote for Her Majesty's ships employed as surveying vessels was 72,860*l.* in 1861-62, and 62,678*l.* in 1873-74: a deplorable reduction of upwards of 10,000*l.*, which represents a proportionate decrease in efficiency, and in the amount of useful work done.

The surveys are carried on either by regular ships-of-war specially fitted for that purpose, or by small hired vessels; the latter method being adopted where practicable, with a view to economy. Of the former there are at present only four! On the home coast there is one small surveying steam vessel, the 'Porcupine,' under Staff Commander Parsons, with a hired crew. Thanks to the representations of Sir Bartle Frere, there are two surveying vessels on the East Coast of Africa, H.M.S. 'Shearwater,' commanded by Captain Wharton, and H.M.S. 'Nassau,' Lieutenant F. J. Gray (see *Ocean Highways* for February, 1874, p. 474). Lastly, there is H.M.S. 'Sylvia,' which vessel was paid off at Sheerness in April, 1873, and re-commissioned in the following November, by Captain St. John, in order to resume the survey of Japan. The surveying ships are not, as was formerly the case, supplied with naturalists, and in all other respects an amount of economy is enforced, which impairs efficiency. If we look back for about ten years, a far more satisfactory state of things prevailed. In 1862 there were twelve of Her Majesty's vessels engaged upon surveying duties, instead of only four, as at present. The 'Seaflower,' 'Rose,' 'Bann,' 'Asp,' 'Seagull,' 'Woodlark,' and 'Porcupine' were at work on the coast of the British Isles. Captain Spratt had the 'Medina,' and Commander Mansell the 'Firefly,' in the Mediterranean. The 'Rifleman' and 'Swallow' were surveying in the China seas; and Captain Richards himself was at work off Vancouver's Island in H.M.S. 'Hecate.'

At present, besides ships-of-war, there are eight hired vessels or boats' parties employed on surveying work. In Australia, Staff Commander Stanley, with a colonial steamer and hired crew, is surveying the coast of Victoria, and Staff Commanders Bedwell and Howard, with hired schooners and crews, those of Queensland and South Australia. Navigating Lieutenant Archdeacon, with a hired boat's crew, is performing similar service on the coast of West Australia. The Australian Colonies in one instance provide a vessel, and in others pay a share of the expenses of the surveys. Lieutenant Llewellyn Dawson is borne on the books of the Commodore's ship, for doing surveying work in New Guinea. In the West Indies, Staff Commander Stanley is at work, with a hired schooner and crew, and Navigating Lieutenant Maxwell is surveying the Newfoundland coast, also in a hired schooner. Staff Commander Kerr is surveying with a hired steamer and crew on the west coast of England, and Staff Commanders Hall and Ray in a steam launch at Portsmouth.

The number of all grades of naval officers, employed on surveying duties afloat, is two captains, one commander, seven lieutenants, twelve staff-commanders, fourteen navigating lieutenants, and twelve sub-lieutenants: total forty-eight.

The most important duties of the Hydrographic Department are to execute accurate surveys of all parts of the world which are visited by British ships, to prepare and publish these surveys in the form of charts, to write and publish nautical directions to accompany the charts, to prepare annual tide tables and light lists for all parts of the world, to take charge of remark books from the captains of Her Majesty's ships, to collect, compile, and promptly publish all hydrographic notices and warnings of dangers, and to keep the charts and other nautical documents corrected up to the latest dates. It is also the duty of the department to supply Her Majesty's ships with charts, chronometers, and nautical almanacs, and to see that there are always sufficient charts and nautical works to meet the public demand. Some idea may be formed of the extent of this demand when it is stated that, on an average, there are 100,000 copies of Admiralty charts sold annually to the general public and to foreign governments, exclusive of the supply to the Royal Navy; and that about 21,000 copies of the nautical almanac are sold annually. Then there are 450 chart boxes, each containing on an average from 300 to 400 charts in constant circulation for the navy; and 1000 chronometers are constantly in circulation between the Royal Observatory and Her Majesty's ships. It is worthy of remark, that all foreign navies navigate by our charts, and all our sailing directions are immediately translated, especially by the French authorities.

Not the least important of the functions of the Hydrographic Department is its responsibility for all matters connected with the compasses of Her Majesty's ships; each individual ship of modern construction having to be visited, special observations made, and the compasses adjusted by magnets, both on her first equipment and at subsequent periods.

The preparation of charts is under the superintendent, whose duties are of a very important and responsible character. They are at present ably performed by Staff Commander T. A. Hull, who is an experienced practical surveyor, as well as a good draughtsman. The copper-plate engravings of the charts were for a long series of years executed by one firm—Messrs. Walker, of Castle Street, Holborn—who also engraved the sheets of the Atlas of India. Since they retired the work has been distributed among three firms. The copper-plates are deposited in the vaults of the Admiralty, at Whitehall, which at present contain 2700 plates, at an estimated value of 170,000*l.* About sixty are added to the stock annually, but of course many of the old plates are superseded in consequence, and are laid by as obsolete. The printing of the charts is entrusted to one firm, Messrs. Malby and Son. There are constant additions and corrections being made in the charts, and a certain number of copies of each, varying

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from six to twelve, are for this purpose constantly on the shelves of the Hydrographic Department. As there are 2500 different Admiralty charts in circulation, the number collected at one time on the shelves may amount to as many as 30,000. A large number of the plates, which are most generally in use, are permanently lodged at Messrs. Malby's establishment, in a fire-proof receptacle.

For the circulation of the charts the Admiralty employ one sole agent, Mr. J. D. Potter (Poultry, E.C.), who agrees to circulate them as widely as possible for the benefit of navigation, at the prices attached to each. For this purpose he employs sub-agents at all the principal ports, at home and in the colonies. From the sales by the agent, the Treasury receives about 6000*l.* a year, so that this branch of the department may be truly considered as self-supporting, or nearly so. In 1873-74 the cost of engraving, printing, and mounting charts was 11,000*l.*

It is evident that the work of the Hydrographic Department, on shore and afloat, is practically the most useful and important upon which the Navy can be employed in times of peace. Sir Bartle Frere, in his admirable letter to Mr. Gladstone on the subject of the Arctic Expedition, only expressed the feeling of every seaman, when he protested against the insinuation that voyages of survey and discovery were not strictly "professional naval services." "There are few better naval schools than a surveying or discovery ship," he truly added, "and if such ships were multiplied, not only would commerce benefit, but men-of-war would be better supplied with practical seamen than is possible at present. This is more especially the case with regard to any Arctic voyage of discovery. Service in the Arctic seas is one of the best possible schools for seamen, and is one of the few schools which now remain, by which a thorough seaman can be formed quite equal to the best men of former days." The despatch of voyages of discovery, especially for the prosecution of Arctic exploration, and an increase in the number and efficiency of surveying ships are measures which should no longer be neglected or postponed. There is at length a well-grounded expectation that an Arctic Expedition will be despatched next year; and Admiral Richards, by his zealous and indefatigable exertions to improve every branch of his department, has prepared the way for a better order of things in other respects. One great want is the appointment of skilled naturalists to ships employed on distant and little-known coasts, such as the East Coast of Africa and Japan. Another is the provision of better and more completely equipped vessels. There is much room for improvement; great need that our rulers should more fully appreciate the importance of an efficient administration of the surveying branch of the service; and we earnestly trust that the days of false economy and of gross neglect of enterprises of discovery and survey are numbered.

Much of the information in this article is derived from a valuable Memoir on the Hydrographical Department of the Admiralty, which was drawn up by Admiral Richards in 1868.

THE ISLAND OF HORMÚZ (ORMUZ).

WHEN visiting the once celebrated island of Hormúz last March, I was informed by some natives that the heavy rain which had then just fallen had exposed to view some inscriptions, by washing away the soil with which they had been covered.

On proceeding to the spot with them, I found two flat horizontal stones about 5 feet by 3 in size, with the inscriptions in Portuguese of which copies are attached, and which appear to be only ordinary mortuary records. They are of date 1591 and 1603, and are the only inscriptions I have ever been able to find on the island. The position of the stones is indicated on the plan.

As I do not believe there exists any detailed description of the present state of the island, and of the remains of its ancient grandeur, a brief sketch of them may be of interest, and a glance at the history of its rise and fall is also added. Its very name has a charm, which the place itself little deserves, and is probably due to its mention by some of our great poets. I doubt whether its reputation for magnificence was altogether deserved,* certainly not so according to the ideas of the present day. How strange the power of genius, which by a single line† can thus immortalize an obscure settlement on a barren isle, and render it a synonym almost for barbaric magnificence.

The appended view of the Portuguese fort and point gives a sufficient idea of its present appearance from the anchorage, and the plan, from a survey made by myself, shows the approximate extent of the ancient cities and modern village, with a careful ground plan of the fort.

The island, which is rather more than four geographical miles across, and roughly circular in shape, presents a mass of hills, from 300 to 700 feet in height, occupying a space of about 3 miles each way on the south and south-west sides, the shores of which part are quite precipitous, the north and east sides presenting a low plain. Its surface is therefore pretty equally divided between hills and plain.

The hills are of somewhat remarkable geological character. There are some stratified rocks, forming the cliffs at the south-east angle, but the whole of the rest are probably of volcanic origin, and consist chiefly of rock-salt, which is raised to a height of 300 to 400 feet, and presents the most fantastic outline conceivable owing to the dissolution of the salt. They are incrusted with bright-coloured earths, red, purple, and yellow, and are almost impassable, owing to the exceeding ruggedness of the surface.

With these salt hills are associated several peaks of white or light grey-coloured rock of trachytic character, the highest of which rises to 700 feet, and all are of sharp, precipitous outline. A view from the top of the high peak presented a perfect wilderness of pointed and rugged ridges, separated by abrupt valleys and singular funnel-shaped holes of various sizes, some of very large dimensions, possibly 200 feet in depth, and others only a few feet deep, but all at a very steep slope. The trachytic rock is studded with iron pyrites and other minerals, often in most beautifully developed crystals.

* See also J. B. Fraser's narrative on this subject.

† Or rather a single word in a line—

"High on a throne of royal state, which far
Outshone the wealth of Ormus and of Ind."—*Milton.*

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Portuguese Fort.

NOAT

Present Village.

Minaret

Probable extent of Portuguese Town.

FOUNDATIONS

Site of Turrets etc

Ruins with arches and embrasure.

North End
OF
HORMÚZ ISLAND
SHEWING
SITE OF ANCIENT TOWNS &c.

Approximate extent of ruins of old city

Many old (D) water cisterns.

Ruins of Musalman Mausolea

Ruined Chapel

Salt Wells 300 — 400 feet.

Range of

Ruined Chapel with remains of zigzag path.

Scale of One Statute Mile.

0 ⅛ ¼ ¾ 1

A
ESTA SEPHEDESI
MAORO 13 DEFAR
IAE DESVAMOL
HERE·HERDROS
FALECEOEILEA
A·Z·DEA ÞRILDE
ÞOIEILA·A8DEE
EVRODE Þ03

SEPVTRA·DE
AMTONO·CO
REA·E·DE SEVS
IR DEIROS FALE
SEO·AOS·17 DE
IA NE IRO·DE·1591
ANNOS

COAST OF PERSIA

Mausolea of Europeans.

BANDAR 'ABBAS called Gombroon by Dutch authors early voyagers.

Portuguese Fort

Minaret

SITE OF CITY

HORMÚZ

700

Ruins of Turun-tagh.

PART OF JAZIRAT AT-TAWILAH

Portuguese Fort.

TOWN OF KESM.

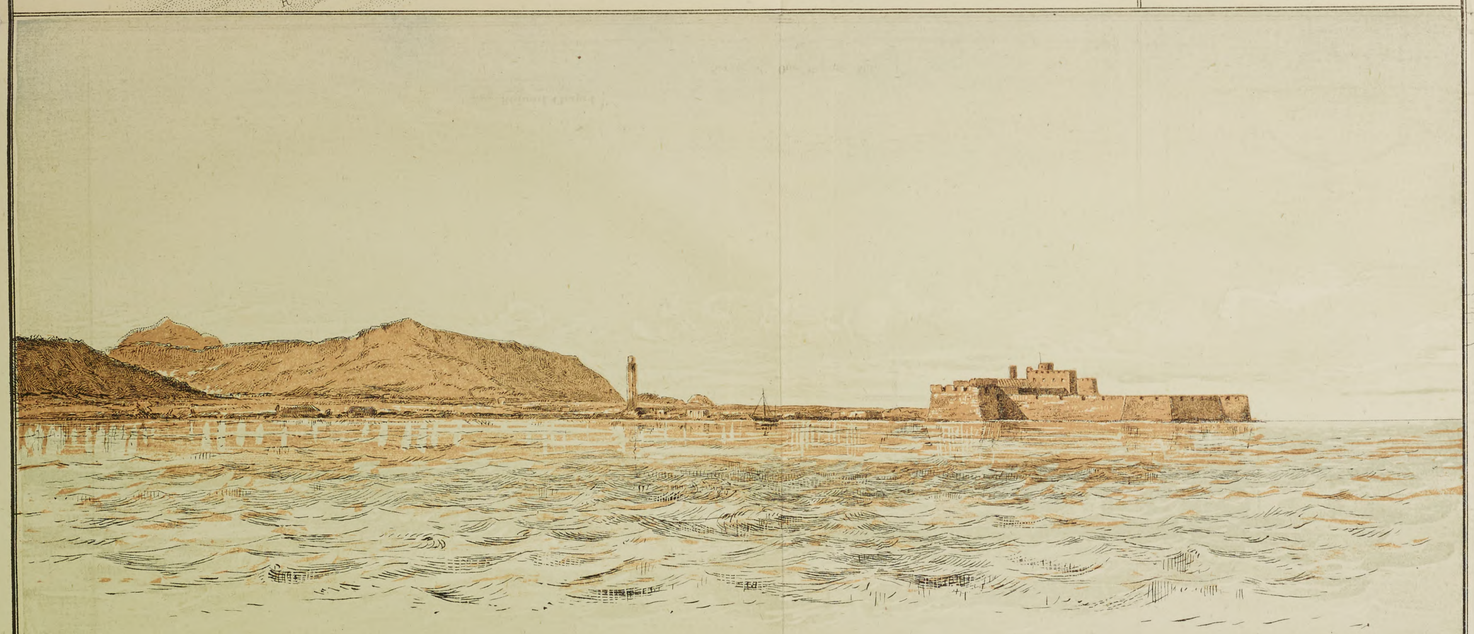
Map
shewing the position of
HORMÚZ ISLAND,
with reference to the
PERSIAN COAST,
AND THE OTHER
OLD EUROPEAN SETTLEMENTS
IN THE VICINITY.

From actual Survey
by A.W. Stiffe, late Lieut. R.N.

Scale of Statute Miles.
0 1 2 3 4 5

Unfinished old Dutch Fort

Part of Larak Is.



PORTUGUESE FORT ON HORMÚZ ISLAND, — OLD MINARET ON THE LEFT.

COAST Gombroon of PERSIA

Isl.d of HARMÛZ or ORMUS.

Fortress

Parade

Landing Place

Alkoran

St. Jean

St. Lucia

Isl.d Kûluma

whence Ormûs has its Water.

Lardimira

St. Lucia

Kings Palace

Turumbake

Entrance for Skiffs

BIRD'S-EYE VIEW OF HORMÚZ FROM "ASTLEY'S" COLLECTION.

T.Pettitt & Co. Litho, London.

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The valleys or ravines opening out of this mass of hills, and carrying off the rain-water which is not absorbed in the funnel-shaped pits, have in their course through the plain all the appearance of frozen rivers winding down to the sea. I walked about a mile up one on the salt incrustation, and the illusion was perfect, except as regards the temperature. This salt incrustation is collected and exported to Bandar 'Abbasi and Maskat.

The plain on the north side terminates in a low, sandy point, on which stands the old Portuguese fort, and near it is the modern village, consisting chiefly of mat huts, and containing possibly 200 men, who have a few boats, and export salt fish, salt, and a red earth, called by them *gairu*, which is used for staining and seasoning wood, and is sent to Maskat, and thence to Calcutta. A few soldiers or armed men hold the old fort as a sort of military post for the Governor of Bandar 'Abbasi. The place is rarely visited by a European vessel.

The fort is a quadrilateral bastioned fort, about 750 feet long by 620 feet broad. It has case-mates under the ramparts, and the two southern or landward bastions are built with orillons. The entrance gate is in one of these recesses, and leads successively into two small courtyards, before giving admission to the body of the place. In the *enceinte* is a fine large underground water cistern, with a groined roof, supported by rows of pillars. The south-west bastion and west face are much undermined by the sea, and partly ruinous. Many of the arches and vaults inside the fort have been blocked up with stone to prevent their falling. It was separated from the island by a moat, now filled up; the remains of a bridge across the moat are visible. Many rusty, old iron guns lie about the interior of the fortress. The mortar used was excellent, and much more durable than the stones. The only other remains of the Portuguese town are the foundations of buildings along the sea shore, and the ruins of a sort of outwork, on the landward face of the town, which has embrasures, and has been defended by a moat. The space occupied by the town is about half a mile by a quarter of a mile, as far as can be judged by the appearance of the ground, and from the appearance of the old map attached.

Of the Arab city, the most important ruin is a minaret, about 70 feet high. It is of brick, and has been coated with glazed tiles, in the manner which renders the mosques of Baghdad such striking objects. It has two spiral staircases inside, much broken at the foot, and the whole structure is in a tottering state; the lower courses of bricks, to a height of 6 or 8 feet, being much weathered away, thus undermining the building.

Of the rest of the city nothing remains except mounds strewn with broken pottery, and a vast number of water cisterns, mostly choked with earth, in many of which small crops of vegetables are now raised. At about half a mile to three quarters of a mile to southward of the minaret are a number of Arab tombs of some pretensions to architecture, some of which have been of two stories. They are all more or less ruinous.

In addition to the ruins of the Portuguese town already mentioned, there are the remains of a chapel, with a zigzag road up to it, on a peak of the nearest range of salt hills; also of a small chapel or hermitage on a little hillock on the north-east coast. The quaint little map or picture attached, which is copied from Astley's collection, gives a kind of bird's-eye view of the island and adjacent coast, with ships arriving and leaving, and conveys some notion of the extent of the town. The plain outside the town is much foreshortened, for I believe, from the ruins visible, the town only extended as far as the space shaded on my plan. The two chapels referred to above are shown on it, and have names given to them. The town appears to have contained two churches, and not to have been regularly fortified on the land side. The position of the minaret, if the old sketch be correct, limits the extension of the town northward. The Portuguese are said to have destroyed the mosque belonging to the minaret, as being too near the castle. The plan is probably of a date between 1612 and 1620.

One other ruin of the Arab city remains to be mentioned, viz., the king's palace or Túrun-bágh, on the south-east corner. This is described as the "fairest of all—there, upon a plain between the hills and the sea, you see a country seat of the old kings of Ormuz, adorned with groves of palm trees and two large cisterns for water." The ruins of buildings and of water channels for irrigation are to be seen here, which is the only point on the hilly part of the island where stratified rocks are found, and which is free from the all-pervading salt deposits.

The general plan, taken from the Persian Gulf chart, shows the situation of the island with reference to the surrounding land. The Portuguese fort in Kesm town is in fair preservation. An old writer not inaptly sums up the appearance of the island thus:—"Formerly this island was on fire, which left it so uncouth, that it is amazing to those who behold it."

History.

The earliest settlement of the island, which had previously been uninhabited, was made about 1301 A.D. or 700 A.H. An account of it was written by Túrun Sháh,* the king of the island in 1347-78. Before the above date, the kingdom of Hormúz was on the mainland, and this history says it was founded by Arabs, who crossed over from Arabia, but gives no date. This is highly probable, as nearly all the cities on the Persian coast have been thus founded. The site of this city on the mainland has been conjectured to be on the Mináb River. It possibly succeeded an older settlement of the same name, for Arrian tells us Nearchus found a town called Harmozia at the mouth of the river Anamis, in a fertile district. The island was then called Gerun (variously spelt), and the name Hormúz only applied to the kingdom and city on the main.

The history says the twelfth king of Hormúz reigned thirty-five years, and died A.H. 676 (1278), which is the first date given, and would not put the foundation of the settlement on the main earlier than, probably, the end of the 11th or middle of the 12th century. It then appears that during the reign of Mir Bahdin

* The History of Persia, to which is added an abridgment of the Lives of the Kings of Ormus. The Persian History, written in Arabic, by Mirkond, that of Ormus, by Torunxa (*sic*); translated into Spanish by Antony Texeira, and now into English by Captain John Stevens, London, 1715.

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Ayaz Seyfin, fifteenth king of Hormúz, A.H. 700 (1301), swarms of Turks, or more correctly Tartars, under the descendants of Jengis Khan, "broke into the kingdom of Kermon (Karmán), and from thence to that of Ormuz. The wealth they there found tempted them to come so often that the inhabitants, no longer able to bear that oppression, left the mainland, and went to the island Broct, by the Portuguese called Quixome" (now called Jezíret at Tawílah, or after the name of the town on it, Kesm). After some days Ayaz went about that part of the gulf seeking some convenient island where he might settle with his people. He came to the then desert island of Gerun, and resolved to beg this island of the king of Keys (Kais), to whom it belonged, as did all the others in the Gulf of Persia. The island of Kais, at that time a kingdom, has still the ruins of a considerable city on its north side, and formerly had all the trade that afterwards was removed to Hormúz. Having obtained of "Neyn, king of Keys," the island of Gerun, Ayaz and his people went to live there, and in remembrance of their native country they gave it the name of Hormúz. Ayaz was the fifteenth king of Old Hormúz, and the first king of New Hormúz. Then follows a period of wars with the kings of Kais and Bahrein, resulting in the maritime supremacy of Hormúz; about 1320, Kodbadin, the fourth king, took Kais and subdued Bahrein.

In the history by the Abbé T. G. F. Raynal, translated by J. Justamond, the following graphic but somewhat high-flown description of the Arab town is given:—"Hormúz became the capital of an empire which comprehended a considerable part of Arabia on one side, and Persia on the other. At the time of the arrival of the foreign merchants, it afforded a more splendid and agreeable scene than any city in the East. Persons from all parts of the globe exchanged their commodities and transacted their business with an air of politeness and attention, which are seldom seen in other places of trade. The streets were covered with mats and in some places with carpet, and the linen awnings which were suspended from the tops of the houses, prevented any inconvenience from the heat of the sun. Indian cabinets ornamented with gilded vases, or china filled with flowering shrubs or aromatic plants adorned their apartments. Camels laden with water were stationed in the public squares. Persian wines, perfumes, and all the delicacies of the table were furnished in the greatest abundance, and they had the music of the East in its highest perfection." The beauty of the women is expatiated on rather warmly for an Abbé, and he winds up thus:—"In short, universal opulence, an extensive commerce, politeness in the men and gallantry in the women, united all their attractions to make this city the seat of pleasure."

But the time was at hand for a new power to appear on the scene: the Portuguese, at that time the first of European maritime nations. In March, 1506, sailed from Lisbon Alonzo d'Albuquerque and Tristan d'Acunha, with 13 ships and 1300 men—small means to undertake such extensive conquests. We have only to follow the former, who was to cruise on the coast of Arabia. Having subdued the island of Socotra, and built a fort on it, the fleet separated, some of the ships going to India; but Albuquerque, with 7 ships and 460 men, took and plundered all the towns on the coast of Arabia, viz., Calayatte (Karyat?) Mascate (Maskat), Soar (Sohar), and Orfuzam (Khorfakán?), and thence sailed to Hormúz, then first seen by Europeans, and whose wealth and splendour had attracted the cupidity of the Portuguese Government. The ruins of Maskat, it is recorded, were given up to the inhabitants, on the proviso that they should pay to the king of Portugal the same tribute they had paid to the sovereign of Hormúz.

Albuquerque found Hormúz defended by 30,000 men, but boldly summoned the king to become a tributary of the Portuguese crown. The king returned answer that the kings of Hormúz were not used to pay, but to receive, tribute from foreigners, &c. Albuquerque commenced an attack by sinking and burning the fleet in the roads, when King Seyfadin, being sensible that the city would share the fate of the fleet, submitted, and agreed to pay 15,000 xeraphines annual tribute, and that Albuquerque should have liberty to build a fort, for which he was to be supplied with money and necessaries. The fort was at once commenced; but the discontent of the "gentlemen volunteers" at the suspension of their profitable plundering expedition, resulting at last in open mutiny, necessitated his abandoning the work for the time.

However, when Albuquerque was appointed Viceroy of the Indies in 1515 (date not quite certain), an armament of 27 ships and 1500 men was fitted out at Goa, and the viceroy compelled the King Toro (*sic*) to allow him to finish and arm the fort, furnishing materials for the same, also to swear an oath of fidelity; while the city was to be disarmed by the removal of the cannons into the Portuguese fort. Certain hostages also, persons of the royal family, were sent to Goa. As the king's favourite minister, Hamades (probably Ahmad), appeared inclined to thwart the Portuguese, Albuquerque had him put to death; the fleet then returned to Goa.

The conquerors now began to oppress the people, and in 1521 Siqueira appointed Portuguese collectors of customs at Hormúz, which seems to have been the last straw. An extensive conspiracy was formed, which resulted the following year in a simultaneous insurrection by night at Hormúz, Karyat, Sohar, and Bahrein, which failed, although many of the Portuguese were killed; those only at Hormúz escaped who took refuge in the castle, which the inhabitants vainly endeavoured to take. After this failure King Toro retired with all his subjects to the island of Queixome (Kesm), and set fire to the Arab city of Hormúz, which burnt four days successively. Soon afterwards this king was murdered by one of his own confidants, and his son, Muhammad Shah, who succeeded him, made a new league with the Portuguese, paying an increased tribute, notwithstanding the decreased resources of the state.

In 1529, when Nuno da Cunha was appointed Governor-General of India, he visited the island, and redressed some of the private grievances of the oppressed people, but not abating the exorbitant tribute, which, in 1543, was raised to 100,000 ducats annually.

In 1552 the Turks fitted out an expedition at Basrah under one Pír Beg "a veteran pirate," which took Maskat; but failing in an attempt on the fort of Hormúz, they plundered the city, and returned to Basrah with a rich booty.

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The succession of the kings, whose power soon became quite nominal, was preserved inviolable during the occupation of the Portuguese, but the new king could not be crowned without the permission of the Portuguese: he had also to take the oath of fidelity to the King of Portugal, and could not quit the island without the consent of the governor. The commerce and importance of the island commenced to decline from the Portuguese occupation, partly owing to the rapacity of the Portuguese, and doubtless also on account of the new channel for trade opened *viâ* the Cape of Good Hope; but it was sufficiently prosperous to excite the jealousy of Shah 'Abbas of Persia, in the beginning of the 17th century, who at length wrested it from them.

It appears that the Portuguese when in the height of their power allowed no ships to navigate those seas without a pass from the captain of one of their forts, and only under oppressive conditions.

In 1620 or 1621 the Portuguese built a fort on Queixome (*sic*), but it was soon besieged, and taken in February, 1622, by Shah 'Abbas, with the assistance of the English, on which occasion fell William Baffin, pilot, the distinguished Arctic voyager.

We now see the first appearance of the English in the Gulf of Persia: the ships of the East India Company at this time appear to have been at open war with the Portuguese in the Indian seas, although the two countries were at peace in Europe. It must be admitted that the league with the Persians to "betray* Christianity, which the Dutch to their credit refused," seems at the present day a questionable proceeding. The consideration is represented to have been profit to the Company, in the shape, first of a share of the plunder, which it is a comfort to reflect they did not get; and secondly, half of the customs duties at Gomaron or Gombroon (Bandar 'Abbasi); but the following account of the closing scene at Hormúz, taken from a "relation of the war of Hormúz, and the taking of that place by the English and Persians in 1622," shows also more legitimate motives.

In justice to the Portuguese, with reference to the siege, it should be stated that the fort is said not to have been in a good state of repair, and the moat had been allowed to fill up with sand. Their governors were relieved every year, and "had but a slender knowledge of martial affairs. The governor at that time was an ancient man and not trained up in the wars, and not provided with experienced gunners"—results apparently of a strict seniority system; but for all that, their defence was desperate, as appears in the narrative, which is (somewhat abridged) to the following effect:—

At a consultation held in Swally Roads (Surat) a commission was given by the President and Council at Surat to Captains Blithe and Weddell, who were bound for Jasques (Jáshak)† with five good ships and four pinnaces. The ships were the 'London,' 'Jonas,' 'Whale,' 'Dolphin,' and 'Lion.' They were to sail for Jasques at once, keeping together for mutual defence; and as the Portuguese had disturbed the trade, and made sundry assaults upon our ships, they were authorized to capture any vessels flying the Portuguese flag, and make sundry reprisals on other ships. As the enemy, under Ruy Frere de Andrada, was waiting on the coast of Persia, probably to attack our fleet, they were authorized to use "all advantages" against the Portuguese even in their own ports, if approved by a general council of war.

They arrived in Costack *(sic)* Roads (an open roadstead on the Persian Coast near Mínáb) on the 23rd of December, Hormúz being in sight about 10 leagues W.N.W. The English factors here informed them that the Portuguese had erected a fort on "Kismis," to which the Persians had laid siege for many months ineffectually, and had lost a great many men. (It appears that Emam Kooli Khan, Governor of Fars, had received orders from Shah 'Abbas to take Hormúz at any cost.) "Wherefore the Prince of Shiraz had demanded the aid of our ships against the common enemy, the Portuguese," *threatening otherwise to detain all the goods and money belonging to the Company in Persia.*

In a consultation on board the 'Jonas,' articles of agreement were drawn up for giving aid to the Persians, and sent to the Khan of Shiraz, then on his way towards Mínáb. The English consented to act under fear of an embargo being laid on their goods, and also because they considered it would be "for the public benefit and the securing a peaceable and profitable trade."

The agreement was ratified by the Persian governor subject to some points reserved for the king's decision; but "when the news of this agreement became known among the ships' companies, they refused to take any share in the business, but after much pains they were reconciled to it."

On the 19th of January, 1622, they anchored before the town of Hormúz, expecting that the enemy's armada would come out to fight; but as they did not, and as Ruy Frere de Andrada was in the new fort on Kismis, they sailed to that place, where they arrived next day. The Portuguese, who were in extremities, surrendered themselves and the fort to the English on the 1st of February. There were 17 guns and about 1000 persons of all sorts in the castle.

On the 4th of February the fleet proceeded to Gombroon, whence Ruy Frere was sent to Surat in the 'Lion,' accompanied by two pinnaces, so that only four ships (merchantmen too) and two pinnaces were left for the attack on Hormúz. This does not indicate much strength in the Portuguese fleet, or else much courage in their commanders.

On the 9th of February they sailed for Hormúz, having with them about 200 Persian boats, and next morning disembarked about 3000 Persians, who marched to the town "in a confused manner." They penetrated to the maidan or market-place without resistance, but here found barricades erected, from which the Portuguese were soon dislodged and driven into the castle. The Portuguese, it appears, were afraid of being intercepted in their retreat to the castle, and also of treachery on the part of the Muhammadan inhabitants.

The Persians plundered the town, breaking into all the shops and houses, and "wearied themselves with carrying away plunder all day," and at night slept out without any military precaution, "so that had the Portuguese made a sally they might have slain

* Dr. Careri's voyage around the world, 1694. Churchill's collection. The old priest's horror at our joining *infidels* against them is characteristic.

† Our ships were not allowed by the Portuguese to enter the Persian Gulf. Jáshak is a port outside the entrance.

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numbers." Probably the "ancient" governor was not equal to such a determined proceeding.

The Persians then threw up trenches, and the English erected batteries for ordnance for them, also "sconces" and other works for protecting the trenches. The English vessels meantime engaged the Portuguese fleet from a distance, and sent in fire-ships, which on the 24th of February destroyed the 'San Pedro,' formerly admiral of Andrada's fleet.

On the 17th the Persians exploded a mine under one of the bastions, charged with forty barrels of powder, by which a practicable breach was made in the salient angle. They then made a fierce assault, and about 200 men made a lodgment in the bastion, but were eventually repulsed by the Portuguese, who fought bravely. The Persians also set fire to the city the same day, by command of the general, for the curious reason that his soldiers skulked in the houses, and could not be got to the attack.

The Persian army, now 4000 to 5000 strong, was (as may be imagined) without any stock of provisions, and what water was found in the cisterns in the city was soon used, so that had our ships been driven off by a Portuguese squadron, whose arrival was expected, the situation of the besiegers would have been very critical, as they had to send daily for provisions to the main. They were also badly provided with arms, "they had only small pieces, with bows and arrows, and swords; some of their chiefs had coats of mail."

The patience of the English was much tried by the fraudulent behaviour of the Persian general, who "broke conditions with them in several things" and had conferences with the Portuguese without letting the English know, and other breaches of faith.

On April the 2nd they exploded two other mines, forming a fair and practicable breach; but the Persians would not take advantage of it. The garrison were now getting short of provisions, and suffering from sickness. On the 14th and 17th other mines were exploded, when the besiegers assaulted with 2000 soldiers; a few Portuguese kept them back, the Persians clustering like sheep on the breach, and a flanking battery doing great execution among them, until at last they made a rapid retreat. Another assault on the 18th was also unsuccessful, but on the 19th they got possession of the entire bulwark, forcing the Portuguese to retire further within the castle. On this night a Portuguese frigate escaped the blockading ships, probably richly freighted.

On the 21st the Portuguese made overtures to the English, bearing letters from the captain of the castle and the Almirante, requesting the mediation of the English, and saying that, "if forced to surrender, as they soon must be, they would call upon the English for that purpose, as it were not reasonable for us to capitulate with the infidels when you are present." The English undertook their lives should be saved, and obtained a truce of two days, to draw up conditions. On the 23rd the Portuguese sent to put themselves in the hands of the English, on condition of being sent to Maskat or India. This was agreed to, and English and Persian officers were stationed at the gate to pass the garrison out, and see they took nothing with them. But the Persians conveyed the King of Hormúz with all the Muhammadans, with their treasure, and best things out of the castle by the breach; whole bales of goods, with boxes and caskets full of treasure to an unknown amount, were carried at the same time over the breaches. On the 24th both English and Persians began to pillage "in a shameful manner." In the evening the Khan of Shiraz came over from Gombroon, and made a triumphal entry into the castle, where were 300 pieces of ordnance (brass and iron). The English were employed protecting and embarking the unhappy garrison, who, to the number of 2500, left for Goa on the 27th, in two ships the English gave for the purpose, apparently out of the captured vessels. They were ill treated and stripped by the Persians.

The Persians evaded payment of a sum of money promised, and also of a share of the plunder, by counter representations of the embezzlement of plunder by the English, and the necessity of referring the matter to the king. Then says the account:—"After business was ended, our miseries began, occasioned by the insufferable heat of Ormuz, and the disorders of our own people in drinking arrack, and other excesses no less injurious." The ships lost many men, and eventually left Hormúz on the 1st of September, and arrived in Swally Roads on the 24th.

The sequel to the English expedition is curious. In 1624 a claim was set up by the Crown and the Duke of Buckingham, Lord High Admiral of the kingdom, by which the Company were required to pay a proportion of the prize-money which the ships were supposed to have received. In order to substantiate this claim, a number of the officers were examined, and it appeared that the amount was only calculated at 100,000*l.*, without taking into view the charges and losses incurred by the Company in the war, and by their ships being called off from commercial enterprises. It was at last compounded by a sum of 10,000*l.* paid to the Duke of Buckingham.

The place was utterly ruined by the Persians, who wished to transfer the trade to their new port, Bandar 'Abbasi, and has since remained in the same state. Even the building material appears to have been carried away and used for the new settlement at Bandar 'Abbasi. An old writer a few years later says:—"This poor place, now not worth the owning, was but ten years ago the only stately city in the Orient—This poor city is now disrobed of all her bravery—Ormus Island has no fresh water save what the fruitful clouds weep over her in sorrow of her desolation, late so populous."

After the loss of Hormúz, the Portuguese obstructed with their ships the navigation of the gulf, until a settlement was come to which allowed them a factory at Kung, with considerable privileges, by agreement between the crowns of Persia and Spain, Portugal being at that time united with Spain. They had certain allowances paid them in money, besides half the customs duties.

It is pretty clear that the strength and importance of the Portuguese settlement has been overrated, as well as the wealth and strength of the Arab kingdom. But little over 200 years elapsed between its foundation and capture by the Portuguese; and it then seems to have declined, until its final and total destruction 120 years later. The extent of ground available to build on, would not admit of what would be now considered a large city, and part of this was occupied by tombs and water cisterns. There also appears to have been a

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plain, where "tournaments" and games were held by the "Moors." Nieuhoff says this was called Ardemira, which has the same meaning as Belvedere.

Bandar 'Abbasi* was first founded by the Portuguese in 1612, in which year they took it from the King of Lar, and built two forts. It was taken from them by Shah 'Abbas in 1614, who had then reconquered Lar. The old name of Gombroon is said to be Turkish, and to mean a custom house, "because it was the port where one embarked for Ormus, &c."

The prosperity of the English factory at Bandar 'Abbasi does not seem to have been remarkable, and about the middle of last century it was removed to Abú-Shehr, which was then rising into importance.

A. W. STIFFE, *(Lieutenant late H.M.I.N.)*

A HIGHWAY TO BOLIVIA.

OF all the Republics of the South American Continent there is perhaps not one so little known to the world at large as Bolivia. Possessed of immense internal resources, and teeming with untold wealth, it seems so completely cut off by its geographical position from outer communication, that its riches are of little value to it; while, on the other hand, the same reason has operated to retard that progress of civilization which all the neighbouring states enjoy in a greater or less degree—so that at the present day Bolivia resembles nothing so much as a nut, the kernel of which is only approachable by surmounting an obstacle which places it at a disadvantage compared with any other fruit, and this obstacle is, as I have said, its means of external communication.

Possessed of a comparatively insignificant extent of seaboard, and that remote from the capital, Cobija, on the west coast, is at present the only port in the Republic, and the only outlet for its commerce; while on the north, north-east, east, and south, the richest provinces are completely landlocked, notwithstanding that it would be found, by well directed exploration, that it is in the latter directions the true highway to Bolivia must ultimately be sought. Only recently a company has been formed for the construction of what is called the Madéra and Mamoré Railway, which is destined to complete the line of communication between the Rio Mamoré (which flows into the Rio Grande, and, flowing past Santa Cruz, takes a westerly and then northerly direction again at some distance from Chuquisaca, the capital of Bolivia, to Cochabamba) and the river Amazon, by which means it is believed that the ultimate connection between Bolivia and the old world will finally be established; while, within the last twenty years, attempts have been made to demonstrate the navigability of the Bermejo, the Pilcomayo, and the Otuquis, with the view of diverting its commerce eastward, by way of the great channel of the river Paraguay and the Rio de la Plata.

Personally I have little doubt but that these three tributaries of the Paraguay were intended by nature to convey the wealth of Bolivia to the east, in the same manner that they have for ages past drained its vast plains of their superfluous rainfall, and it only requires for nature to be assisted by a little human skill to witness the full and complete accomplishment of her design.

In a former article I showed what had been done by way of exploration of the Rio Bermejo, but I was not then prepared for the intelligence which has since reached England—about a fortnight ago—to the effect that the first steamer, belonging to the Bermejo Navigation Company, has succeeded in penetrating as far as Esquina Grande, about 720 miles from the mouth of the river, so that the capabilities of that stream to the purposes of commerce may now be said to have been conclusively established. The Bermejo, which flows into the Paraguay in about latitude 27° S., may be traced in a north and north-westerly direction, through the Gran Chaco, and the province of Oran to Tarija in Bolivia, situated in about 21° 50′ S. latitude, whence but a small "portage" intervenes between it and the river Pilaya, which flows into the upper waters of the Pilcomayo, which in its turn ascends beyond Chuquisaca, in latitude 19° 50′, so that even if the Pilcomayo be not navigable, as it is feared, near its junction with the Paraguay, there can be little doubt that the Bermejo will itself answer all the purposes of a riverine highway to the basin of the La Plata, and so into the Atlantic Ocean.

One of the richest of the provinces of Bolivia is, however, Chiquitos, the locality of some of the most celebrated of the Jesuit Missions, and it is through this province that the Otuquis flows, joining the waters of the Upper Paraguay in S. latitude 19° 52′, longitude 58° 16′ W., at a spot called Bahia Negra. As yet, the capabilities of the Otuquis for traffic have been but imperfectly ascertained, but there is no reason to doubt but that with a very slight exercise of engineering skill that channel might be opened up, and thereby a highway secured, offering far greater facilities for commerce than the more expensive and laborious route northward to the bosom of the Amazon. So long as forty years ago the importance of opening up the navigation of this river had impressed itself upon the Bolivian Government, for we find that, in 1832, one Señor Don Manuel Luis de Oliden made a proposition to Congress to that effect, in consideration of which the following act was passed on the 5th of November in that year.

"The Executive will grant to Citizen Manuel Luis de Oliden such aids as it may think proper, in order to enable him to establish a port at the confluence of the Rivers Otuquis, Tucabaca, and Latiriquiqui, or at such point as may be most suitable in order to open the navigation of these into the river Paraguay, conceding in addition those privileges which are due to him as the originator of this enterprise."

(Signed) I. EUSTAQUIO EQUIBAR, *President.*
DIONISIO BASSIENTOS, *Secretary.*

This act was followed, on the 17th of the same month, by a decree of the Supreme Government, granting, among other privileges, to Citizen Manuel de Oliden from the points he may select at which to establish a port on the river Otuquis, south of the province of Chiquitos, 25 leagues of territory in every direction to himself and his heirs absolutely. Even so late as the year 1854, endeavours were being made in London for the formation of a Colonization Company, to settle the "Oliden Grant," though they would appear to have fallen through; nor do I

* *Voyages du Chevalier Chardin en Perse, &c.* Amsterdam, 1735.

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hear that any further steps have been taken subsequently in this direction. The Oliden Grant, between the parallels of 17° 45′ and 20° 15′ S. lat., is bounded on the east by the Paraguay, and extends 150 miles westward. This includes the settlements and military posts now held by the Brazilian Government; but as the territory claimed by Brazil reaches but a short distance west of the Paraguay, and does not embrace any portion of the Otuquis River or Bahia Negra, their claim can in no way materially affect this grant, should the Bolivian Government be disposed to allow its provisions to be still in force, notwithstanding the time that has elapsed from the passing of the decree.

A very interesting account has been written by Mauricio Bæck, of the labours of Señor Oliden in this province. He writes:—

"The village of Santiago, which Mr. Oliden made, in 1833, the centre of his operations on the southern border of the province of Chiquitos, and situated on the cordillera of the same name, has a population of 1380 souls, and enjoys a temperate and salubrious climate. This cordillera, whence issues many streams, which form the river Otuquis, contains, according to reliable authority, mines of gold, silver, quicksilver, and precious stones. In the mountains are most valuable woods and medicinal plants. On the plains south of this cordillera are skirts of wood, palm, and grass lands suited for grazing: the soil is of remarkable fertility. At a distance of 7 leagues from the above-mentioned point, Mr. Oliden formed his first settlement on the Rio Agua Caliente (Hot River), over the ruins of the old town of Santiago founded by the Jesuits, which is now called Florida. The Rio Agua Caliente takes its rise in a warm lake 5 leagues south of Santiago. This settlement was composed, in the year 1836, of several handsome houses, which had been erected by order of the 'Empresario,' and is the point which he had selected for his own residence. He established large farms, which were cultivated with great success: corn, of which two crops were made annually; rice, equal to that of Bengal; mandioca of extraordinary size; coffee of superior quality; cocoa, sugar-cane, and tobacco—this last the best known—sweet potatoes, pea-nuts, beans of every variety, and every class of vegetables.

"He established estancias south of this town on rivers of never-failing water, where the grazing was abundant for the rearing of cattle, sheep, and mules. From Florida he opened a road to the Great Salina, distant 50 leagues, from which, by way of the Cordillera de Lances, it may be continued to Chuquisaca and Tarija. Another road was opened from Florida to Oliden—the central point of the new province—distant 16 leagues east. This was the situation of the old town of 'Corazon de Jesus,' founded by the Jesuits on an elevated plain by the side of the Rio Tucabaca; in latitude 19° 4′ S., longitude 61° 3′ W. from Paris. Another road has been opened from Oliden to the town of Santa Corazon, distant 22 leagues N.N.E. This town has a population of 1106 souls, and its climate is rather hot than temperate. On this road, and at a distance of 15 leagues from Oliden, the 'Empresario' established a 'Hacienda' or farm, which he called 'Sietos,' for the cultivation particularly of cotton and sugar-cane. Its product in the year 1836 was very considerable. In the vicinity of the town of Santiago on the Serrania of the same name, and in the valley formed by the same, he established another 'Hacienda,' called 'Rinconadra,' for the cultivation of the sugar-cane. Its product in the same year was equal to that of 'Sietos.'"

Some conception may thus be formed of the fertility of these lands; and as the Government of Bolivia has always been eager to encourage emigration, there is room to believe that before many years are over the lands granted to Señor Oliden will be fully colonized, a consummation which would no doubt be materially hastened by the opening up of the river to steam navigation.

In 1854 Captain Page, of the United States Navy, ascended the Otuquis for a distance of 31 miles from its junction with the Paraguay, and he adds in his account of that expedition that as the navigability of the river is supposed to be established from the high lands of Bolivia for a long distance in its course south-east, it only remains to determine the connection between these two points. The reason which prevented Captain Page from further exploring the Otuquis was that the channel was almost entirely closed by "Camelotes" and "Tapagem," or floating grass, which became so clogged in the wheels of the steamer as to prevent her further advance, though even at the point where he abandoned the enterprise there was still a depth of 9 feet of water, so that it may be reasonably supposed that there exists no insurmountable difficulty to modern science in the removal of this growth of weeds, and so freeing the channel for the passage of river craft of a moderate draught. Captain Page himself says, "I am convinced that a steamer properly constructed could skim over or cut through this sea of grass." Some idea of the size of this river may be gathered from the fact that at a distance of 25 miles from its mouth, the breadth from bank to bank was 600 yards, and the depth of water 14 feet. The aspect of the country is generally flat, except where to the north-east the mountains of Coimbra and Albuquerque loom in the distance; in every other direction nothing but grass and water as far as the eye can reach, with an horizon so clearly defined, "that," as Captain Page writes, "the altitude of a heavenly body might be taken during the day with the same accuracy as by observation made with a sea horizon."

Five years later this indefatigable explorer made a land journey by permission of the Bolivian Government into the province of Chiquitos as far as the town of Corazon, which has been before referred to; but he was at that time unable to carry out his own wishes by exploring the Otuquis River downwards from that point to the place where his former expedition terminated, and so conclusively demonstrating the complete navigability of the stream throughout its entire course. Captain Page, however, publishes the following interesting letter from Mr. Louis Vernet, who was thoroughly familiar with the history of the Oliden Grant, and which goes far to show the opinion entertained by those conversant with the subject. Mr. Vernet writes:—

"The circumstance of your not having discovered as yet the connection of the Otuquis River, at the point where it flows into the Bahia Negra, notwithstanding your repeated and laborious attempts, shows plainly the correctness of your idea that it should be found by entering the river from above, and it is to be hoped that the Government may have received your communication from near Santa Corazon, and followed your advice of examining the Otuquis from above. The

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Government of Bolivia has shown, by its various decrees, the importance they attach to giving this new outlet to the commerce of the Republic, and all well informed Bolivians are enthusiastically in favour of the scheme; but the civil wars, the extensive wilderness which separated the mountainous populous parts of Bolivia from Oliden's Grant, and the total want of direct communication by land or water between the river Paraguay and the towns of Corazon and Santiago of the province of Otuquis, as also the ignorance of the geography of their country, and the want of a spirit of enterprise, are the great obstacles which Oliden's scheme has to contend with, and which to the Bolivians appear insurmountable, but which by a powerful foreign company might easily be overcome. Two companies were actually opened, one in Hamburg and the other in Paris, but the Crimean war broke up the first and the late great commercial crisis the second. Your exploration, if successful, will be a great stimulus to the formation of a company which, if not also interrupted by some crisis, would reap the immense advantages which the enterprise offers, and be highly promoted by the satisfactory information which you may be able to give respecting the accessibility of Santa Corazon or Santiago or the part of the Oliden where "Old Corazon" stood, and from whence the Jesuits used to send produce in river craft to Asuncion, in Paraguay. . . . . Mr. Oliden has opened roads between New and Old Corazon, between the latter and Santiago, and thence to the Salt Lakes. From Santiago and Corazon are ancient roads to Santa Cruz de la Sierra and to Chuquisaca, the capital of Bolivia. Communications between these towns by caravans of mules already existing, nothing is required to conduct Bolivia's trade through the Paraguay other than to effect a passage from the Bahia Negra into the River Otuquis."

From this correspondence it would appear as if Captain Page, at the date of its publication, had expressed some sort of doubt as to the river which he had originally explored in 1854 being the Otuquis itself, or only a prolongation as it were of the Bahia Negra, which previous writers had supposed to be merely a backwater from the Paraguay River, but which Captain Page himself has never doubted to be the legitimate downpour from the highlands of Bolivia, since he states—

"I am convinced that it is not the backing up of the Paraguay: the current forbids that idea, and the colour, even at its junction, is in strange contrast with that of the latter. Between the seasons of high and low water I cannot believe that the waters of the Paraguay could back into this bay, deposit detritus, and receive a colour unvarying from its mouth to the point of ascent (31 miles), black, and yet, in a glass, perfectly limpid, more so than the water of the Parana, while that of the Paraguay is uniformly turbid. This alone would convince me that it flows from the highlands of Bolivia, and may be a navigable stream into the interior of that country."

If there is any faith to be placed on the conclusions of this able navigator—and there seems no reason to doubt it—there only requires a little energy on the part of the Bolivian Government to open up for the Republic a permanent highway by way of the Paraguay to the Atlantic, which would be far less costly for all commercial purposes than the railway which is now in process of construction to the northward by way of the Madéra and Mamoré, and which, at the same time, would largely benefit the adjoining Republics of Paraguay and Argentina, by the trade which would spring up in these waters.

The time has come when the Bolivian Government is called upon to organize these explorations, and open up those outlying portions of its territory itself, which have been hitherto left to the comparatively inadequate resources of private or foreign enterprise.

Alfred A. Geary.

THE KASHGAR MISSION.

Mr. Forsyth and his party left Yarkand on the 28th of November, and found houses comfortably fitted up for them at each stage, on the road to Kashgar. The cold during the journey was intense. They reached Kashgar on the 3rd of December, being met about 3 miles outside the town by Mîrza Ahmad Kûshbegi, one of the highest officers in the court of the Atalik Ghazi, and formerly Governor of Tashkend, before that place was seized by the Russians. The British Embassy at Kashgar is described by the members of the Mission as a remarkably comfortable place. A spacious gateway leads into a courtyard with a broad verandah all round; and on two sides there are good large rooms for the attendants. Thence a gateway leads into a second quadrangle, on three sides of which are comfortable rooms for the members of the Mission, with good Khotan carpets, and the walls hung with velvet. Good fireplaces, with cheerful wood fires, make these rooms as snug as possible; and there is a good sized mess-room, with kitchen at the back. There are also good warm stables, with stalls for 50 horses. All this has been built specially for the Mission, about 50 paces outside the gate of the King's fort, and about 5 miles from the city of Kashgar. Neither Shaw nor Hayward ever reached the city, being left inside the fort of Yungi-Shahr. On the day of arrival the Atalik Ghazi requested the Mission to present themselves in a friendly manner, leaving the official reception for another day. Mr. Forsyth was received very cordially, and the other officers were introduced. The Atalik is described as a thick-set man, about 5 feet 10 inches high, with a broad, good-humoured face. He has now formally assumed the title of Amîr, and is now Amîr Yakub Khan, instead of Yakub Beg, as heretofore, the title of Atalik Ghazi will henceforward be dropped in speaking of him. On the 11th Mr. Forsyth presented the letter from Her Majesty and the Viceroy with all due ceremony, and the Amîr expressed the utmost gratitude. There is not the smallest sign of any restriction being put on the movements of the English officers. Now the treaty is signed (an event which took place on the 2nd of February last), it is expected that the Amîr will move to Aksu, which will give some of the officers an opportunity of accompanying him, and Captain Trotter hopes yet to float his canoe on Lob-Nor. The Amîr, who has received that title from the Sultan, intends to issue a silver coinage with his own name on one side, and that of the Sultan on the other; and the Turkish flag will be adopted in Eastern Turkistan. As regards the Kashgar bazars, nearly all articles of luxury come from Tashkend. Candlesticks, candles, and matches are all Russian. Needles, looking-glasses, and razors can all

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be got at moderate prices, with Moscow trade-marks outside the packets. So far as trade is concerned, it will probably be long before the prejudice in favour of goods with which the inhabitants are familiar is overcome; and, by the Karakorum route, articles needed for common use can only reach Turkistan in small quantities. But the greatest of all obstacles lies in the views of trade adopted by our merchants who come from India. They do not see the advantage of a quick sale with a small profit, and decline to dispose of their goods unless they can realize at least 50 per cent. They cannot at once get paid in gold, and then return with the proceeds, or purchase such goods as they may wish to select, but must regularly settle down and barter little by little. The fact is, we are already late in our endeavour to get a footing in the market, and can only hope to make way slowly. The Kashgar Envoy to Constantinople, who returned with the Mission, brought with him two mountain guns and all the equipments, as well as seven or eight Turkish artillery officers.

After the formal reception, the members of the Mission will accept invitations to *ziafats* from the different men of position, and will return the hospitality in their own mess, at the Mission. They find it a great relief to meet with Muslims who know nothing of the prejudice which prevents the natives of India from such friendly interchanges of hospitality.

The Peking correspondent of the *St. Petersburg Journal* writes that, on the 8th of October last, after some days' fighting, the town of Suchan was taken by the Imperial Chinese troops. The importance of this lies in the fact that the town which commands the road into Dzungaria and towards Hami had been for no less than ten years in the hands of the insurgent Tungans, and had been made by them a base of operations. The Chinese Government is so elated at the victory, that it has rewarded the generals in command with exceptional honours. The troops have been ordered to march upon Urumtsi, Ngansi, and other towns to the west. It is anticipated that no serious opposition will be offered to their advance, the Tungan rebellion being so nearly crushed. But the increased probability of an eventual collision between China and her energetic neighbour, the Amîr Yakub Khan, who is so busily cementing his friendship with England and Russia, cannot but give rise to a variety of speculations.

DR. BECCARI.

(The Italian Naturalist and Traveller).

LAST mail has brought in several letters from this distinguished and enterprising explorer, and I am glad to say good news of his health and hopeful projects of further travels. Beccari writes from Makassar, and his last letter is dated December the 26th. Since he left the Aru Islands he and his collections have had a series of narrow escapes. The *bughis prahu*, on which he had already placed his collections at Dobbo, and which was to carry them to Makassar, arrived at that port nearly in a wrecked condition, after a most disastrous passage. Beccari, on account of some dissension with the *nakodah*, placed his collections on another *prahu* in which they ran as narrow a chance, for amongst them were several Papuan skeletons. The sailors knew this, and as eight of their number died during the voyage, they attributed such mishap to the presence of dead men's bones on board, and would have thrown all Beccari's boxes overboard had not the *nakodah* (a Chinese) used vigorous means to prevent it. Again, the *prahu* with which Beccari had arranged to leave Little Kei for Makassar, and on which, for some trifling disagreement with the owner, he did not embark, foundered at sea, and the crew were saved by mere chance. Beccari appears to have gone in an open boat, and only four men, from Little Kei to Amboina, an undertaking considered foolhardy by the *Bughis* themselves.

Beccari writes to me that the *Bughis* go every year to the northern coast of Australia in search of *trepang*, visiting especially the neighbourhood of Melville Island. They call the land *Tanha Mereghi* and the natives *Orang-mereghi;* these they often bring with them to Makassar. Beccari has seen a lot in the streets of that town, and he has sent me several photographs of that most interesting people. He says that they bear a strong resemblance to part of the population of the Aru Islands. They have *very curly*, but not woolly or spirally-twisted hair; this appears to indicate a cross between pure Australians and Papuans. The features of the *Orang-mereghi* are *decidedly* Australian, and so is the shape of the body and of the limbs. I have long been much interested in the northern Australians, having personally studied those of the south. I believe that the use of bow and arrows, the custom of piling the skulls of their dead in heaps on the top of hills in exposed localities, and other habits in which they differ from the typical Australians, may be set down to Papuan agency. Beccari has greatly surprised me by hinting that the *Aeta* or negritoes of the Philippines are Papuans. I see that Miclucho-Maclay is also of that opinion, which is decidedly at variance with all our previous notions of those two peoples. I have compared photographs of the three branches of the pigmy brachycephalic negritoes inhabiting South and East Asia, viz., *Andamaners*, *Sámangs* and *Aetas;* all agree most closely, and differ unanimously from the *Papuans*, so splendidly described by Wallace. It is, however, evident that there are two varieties of true *Papua:* one tall, with prominent features, the other short, with broad and flat nose; both, however, entirely agree in all other matters, and have that peculiar spirally-twisted hair which naturally grows in *long tubes:* both have a dolichocephalous cranium. The hair of the negritoes is very peculiar—short, woolly, in little isolated spheroidal tufts, very like that of the Bushmen of South Africa, and of the *Akkas* described by Schweinfurth, who are also pigmies, and have a round (not elongated) skull. I have elsewhere suggested that the Akkas, Bushmen, and Asiatic negritoes, are one race of primitive men.

Beccari says that he considers the *Onin* of the south-west as typical Papuans; not so the *Mafor* of the north of New Guinea, in whom he suspects an admixture of Hindoo blood (?). He is going to send me a series of drawings of Papuan profiles, carefully executed with the *camera lucida.*

Beccari has sent with his last letter five chests containing natural history collections, principally zoological. He writes that at Celebes, in the Moluccas and Aru Islands, the belief in the giant cuttlefish (a kind of *kraken)*, which drags down *prahus* with its huge arms

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and great suckers, is general: it goes by the name of *Varcola* in the latter islands.

Beccari has now left Makassar for Kandari, an unexplored region of South-east Celebes, where he hopes to secure specimens of the great *Anoan* antelope *(Anoa depressicornis);* he has also heard of divers mammals which would prove new to the Celeban fauna. After that excursion he will return to Makassar, and either go back to New Guinea, or else visit Sumatra, with the intention of exploring the region inhabited by the *Maias* or orang-outang in that island, in order to add to the splendid series of specimens of that anthropomorpha, collected by him in Borneo, and complete his studies on the habits of those great man-like apes. At Makassar, Beccari met with the courageous Russian naturalist, N. von Miclucho-Maclay, *en route* for a second visit to New Guinea. Beccari was much pleased with Maclay, but grieved to see him depart for such an unhealthy region in a very bad state of health, and so reduced by fever attacks. Miclucho-Maclay intends visiting and residing for some time in the neighbourhood of Triton Bay, in order to continue his anthropological researches, begun amongst the natives of the opposite coast. The Governor-General of the Dutch Indies has promised to send a war steamer to fetch him back after a certain lapse of time. He was proceeding from Makassar to Amboina, where he intended getting a small schooner to convey him to Triton Bay. Becarri has advised him to go up on the hills, where the climate is less noxious. Miclucho-Maclay begged Beccari to give his news, as he did not intend writing any more to Europe before reaching his present destination.

Beccari says that the Dutch are growing rather jealous at seeing so many foreign explorers in their Papuasian dominions, and that they intend sending to New Guinea an exploring expedition fitted up on a grand scale; preparations had been made, but were stopped on account of the Acheen war, which by the way has already cost Italy the life of one of her noblest sons, General Nino Bixio, who lately died of cholera, caught in transporting Japanese troops on his ship the 'Maddaloni,' to Sumatra.

HENRY HILLYER GIGLIOLI.

FLORENCE, *February 20th*, 1874.

GEOGRAPHICAL PROGRESS IN INDIA IN 1873.

DURING the year 1873 there has been material progress made, under the immediate control of Colonel Thuillier, the Surveyor-General of India, with the General or Military Survey of the Native States of Central India, Rajputana, Central Provinces, and Bombay, by the Topographical Department. A one-inch survey is being made of all these Native States, as well as of British non-Regulation States yielding but little revenue, and which are of too rugged, poor, and difficult a character for the larger scale or more elaborate delineation of the Revenue Survey. An area of about 14,054 square miles has not only thus been laid down, intimately connected with the great triangulation, but, through the agency of photography, the whole of the one-inch sheets of the Survey have been rendered, and are in course of early publication.

The geographical exploration of the eastern frontier has likewise been pushed on vigorously, and all the intermediate territory occupied by the Lushais, or other tribes, and lying between the Kachar and Munipúr frontier, and Hill Tipperah, left undone by the Survey parties attached to the military expeditions under Major-Generals Bourchier and Brownlow in the previous season, has been very successfully described. The Garo Hills, hitherto a perfect *terra incognita*, have likewise, under the protection of the military expedition, sent to coerce those refractory and quasi independent people, been well delineated on the quarter-inch geographical scale—entirely filling up the blank which has so unaccountably existed on the map of India, for so many years under British rule, situated as it is so close between the long occupied districts of Goalpara and Gowhatty of Assam on one side, and Mymensing and Sylhet on the other.

In the Naga Hills, the survey has extended to Samagooting in the Naga Hill District and to the Munipúr frontier, and a few seasons more will, it is hoped, fill up all the hilly territory subtending the Assam Valley south of the Brahmaputra River.

The several exploratory parties in these eastern directions have added not less than 11,273 square miles of very fair geographical details to our previous knowledge of this frontier, the general map of which is now vastly improved, and presents a totally different appearance. The object of these operations is to enable the Government of India to select a proper line of defensive frontier, so as to avoid future conflicts with the Lushais and other semi-civilised tribes, which have long disturbed the peace of the frontier.

These Topographical Surveys, averaging an area of from 16,000 to 20,000 square miles annually, being drawn expressly for the purposes of reproduction by transfers from photographic negatives, are at once issued for the use of local officers and the public. A very superior description of printing by the collotype process, direct from the negative, is now in course of treatment, and, when matured, is likely to yield very superior results to those obtained by photo-zincographic printing. Prior to this latter discovery, the one-inch sheets of the Topographical Surveys could not be published, it being more than was practicable to reproduce the Revenue Survey one-inch results by hand-drawing for lithography.

Great progress has been made with the publication of the sheets of the Atlas of India, by copper-plate engraving, during the year. Since the introduction of engraving into the Surveyor-General's Department in India, great strides have been made in filling up the Atlas, the quarter sheets of which are now produced in as good style as they could be in England.

Of the British Revenue-paying rich and champaign districts, the surveys have advanced in the Derahjat and Delhi division of the Panjáb; in Rohilcund and south of the Jummu in the North-West Provinces; in the Sathpuras of the Central Provinces, now close on completion; in the Lower Provinces of Bengal and Assam, also nearly completed, in which the scale is four inches to the mile, with the exception of the districts of the North-West Provinces, in which a perfect cadastral or minute definition of every cultivator's field is being carried out on the sixteen-inch scale, which almost approaches the largest scale used in the Ordnance Survey of Great Britain for the record of

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property. These Cadastral Surveys, under professional management, are introduced as the basis for the revenue settlements now making in the North-West Provinces.

Of the four-inch Survey, 10,280 square miles have been completed, and of the sixteen-inch Survey, 1870 square miles, besides topographical work to the extent of 4362 square miles, making a total of 16,512 square miles.

Topographical Surveys, on a scale of 2 inches to the mile, are likewise being prosecuted in the Bombay districts of Púna and Nasik, to supplement the revenue measurements of fields, conducted by the settlement department of that Presidency and for the purpose of securing proper topographical maps. The sheets of the northern division of the Bombay Presidency in the Atlas of India have for very many years been blank, and it is now determined to get them filled up and published with the least possible delay.

In the Madras Presidency, the Revenue Surveys on the sixteen-inch scale have been going on for many years, but the geographical materials derived therefrom are not yet rendered, or susceptible for incorporation in the Indian Atlas, which contains the results of the Old Military Institution Topographical Surveys of the southern peninsula, of half a century old, and which are now obsolete and require to be replaced by representations of the country as it exists at the present time.

On the Bengal side of India alone an area of about 41,800* square miles of country is thus annually surveyed, equal to about the half of England, which has to be manipulated and turned to ready account at head-quarters, thus involving a vast amount of labour in the various processes of computation of data, reduction, compilation, and publishing on different scales, to meet the wants of the civil administration of the country.

A first survey of all India is the crying want. This is now rapidly advancing, and may reasonably be expected to approach a satisfactory termination within the next ten years or so. With the great triangulation so well advanced, and covering almost the whole of India with its meridional and longitudinal series of triangles like a gridiron, the Topographical and Revenue Survey details are incorporated without difficulty, so as to combine with precision on to the general map, and to produce results of an undeniable character, worthy of a great national undertaking.

The last Annual Report of the Great Trigonometrical Survey of India (1872-3) has just been published, and from it we observe that of principal triangulation, 92 triangles, covering an area of 11,058 square miles, and of secondary triangulation 14,756 square miles have been measured; while of topographical surveying, which is also being carried on by three of the parties of this survey, an area of 2374 square miles, has been finished in the Gurhwal and Kumaon districts of the Himalayas, and of 3878 square miles, on a larger scale, in the rich and fertile districts of Guzerat, and the northern portions of Kattiwar, both in the Bombay Presidency.

The labours of the various parties employed in extending the network of triangulation over the vast expanse of British India, vary in point of difficulty according to the nature of the country traversed. For instance, in Vizagapatam, where Mr. Rossenrode's party was employed, the jungle fever is most banefully prevalent; it struck down Sir George Everest, when a young surveyor in 1818; and in the case of Mr. G. Shelverton—the first officer to take up the same work after a lapse of fifty years—it unfortunately proved fatal. In Assam the extraordinary growth of vegetation makes the clearance of a line of observation a very difficult matter; supplies and labourers have to be procured from a distance owing to the sparseness of population; the best time for observing (*i.e.* between the early showers and regular rains) is the most unhealthy, and in the dry season the villagers burn down the jungles, and cloud the heavens, along the whole extent of country, with an impenetrable pall of smoke. In Jodhpur, on the other hand, the country is sandy and free from tropical growth, and isolated hills form capital stations. Progress was thus an easy matter, though deficiency of water now and then occurred.

In Kattiwar the Topographical Survey is rapidly advancing, and when it reaches the shore of the Gulf of Kutch, efforts will be made to connect the survey with that of the gulf, made by Lieutenant A. D. Taylor, of the Indian Navy.

The Topographical Surveys of Kumaon and Gurhwal embrace a country ranging over 25,000 feet in altitude, from the deadly lowlands of the Terai, to the summits of the great peaks of the Himalayas. As might be expected in such a country, the health of the surveyors was not good, but, nevertheless, a good out-turn of work was shown for the season.

Tidal observations are being conducted at the head of the Gulf of Kutch, and these will be repeated during the next few years at different points along the coast, and connected with a carefully executed series of levels; the principal object being to investigate the nature of the changes in the relative levels of land and sea.

"Trans-Himalayan" exploration by means of native agency is going on in several directions. A Pathan has been sent to the region beyond the Hindu-Kush, with instructions to penetrate, if possible, into the *terra incognita* north of the Oxus, into Shignan, Roshan, Darwaz, and Karateghin. One of the Pundits has been sent into that part of Great Tibet beyond the northern watershed of the Bramaputra.

* Topographical Surveys, 25,327 square miles.
Revenue Surveys ... 16,512 ,,
Grand total ... 41,839

THE PRODUCTS OF WEST AFRICA.

AT the present moment a few remarks upon the products of the West African Settlements cannot fail to be interesting and instructive. The following table will show the value of the trade returns of the four settlements in 1871:—

	Imports.	Exports.
Sierra Leone	£305,849	£467,755
Gold Coast	250,671	295,207
Gambia	102,064	153,100
Lagos	391,653	589,802
Total	£1,050,237	£1,505,864

The principal exports from Sierra Leone are oil, nuts, and seeds; from the Gold Coast, palm-oil; from Gambia, ground-nuts, hides, and wax; and from Lagos, palm-oil, palm-kernels, ground-nuts, indigo, ivory, and cotton.

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Palm-oil is derived from the pulp which covers the palm-fruit, and which grows in large bunches near the top of the palm-tree. These nuts are chiefly gathered or cut from the tree in April. They are first pounded for the purpose of separating the pulp, and are then boiled in water; the oil is skimmed from the surface and put aside for purposes of merchandize. A great proportion of this oil, as well as of the kernels of the nut, finds its way to this country, where it is chiefly used in the manufacture of candles, soap, &c. In Africa, when fresh, it is eaten as butter, and is also used for the purposes of making wine and soup. It is very nutritious and wholesome.

The geological characteristics of the Gold Coast are but little known, but it is quite certain that gold is extensively distributed. It is obtained in its greatest purity in Foutah Jallon, by the most simple process, either of washing the river beds or by digging holes in the earth which is richly impregnated with the precious metal. Gold dust is exchanged for cattle, rice, or other commodities, which are taken inland by the traders.

The interior of Africa abounds in beautiful flowers, upon which bees feed, and the result is that large quantities of bees-wax are deposited, which are collected by the natives. The export of this article has however fallen off considerably within the last twenty years.

The settlements are particularly suited for the growth of the cotton plant: the plant is indigenous to the country, but the cotton is short in staple, and therefore at present much inferior in value to American cotton. It is asserted that by care and cultivation a change in its character and quality would soon be effected. What is wanted, however, is to create a demand for African cotton at a remunerative price to the labourer. It requires more time than the ground-nut to arrive at maturity, and it can hardly be expected that labourers will be as willing to undertake its cultivation as they are now ready to devote themselves to the less tedious cultivation of the ground-nut.

Ground-Nuts.—Unlike the trade in gold, palm-oil, and wax, the ground-nut is the result of continuous and steady agricultural labour through a portion of the year. It is reasonable to suppose that natives engaged in agricultural pursuits which require steady labour and deliberate purpose for even four months in a year, thereby acquire more or less settled habits of life, and that they are naturally led to desire and purchase with the produce of their labour the manufactures and goods of other countries. The wants thus formed exercise in themselves a civilizing influence, and are more likely to multiply than diminish.

That portion of the natives of the Gambia who are engaged in the cultivation of the ground-nut, have shown for many years a great disposition to cultivate the soil when they can do so with security. It is a fact that more than one-third of the produce exported is raised by natives, who travel from distances of 500 to 700 miles in the interior to visit the Gambia, along the banks of which they hire small tracts of ground, which they cultivate. Most of these visitors remain in the neighbourhood until they have earned sufficient to purchase those goods the desire for which induced them to leave their homes. They then form into parties and return home, spreading amongst their countrymen the good tidings of a safe market for their labour. The value of ground-nuts raised in the Gambia, and exported from Bathurst in 1845, only amounted to one or two hundred pounds, whereas the average value of the same article of produce between 1854 and 1867 has been over 100,000*l.* a year. During the last few years there has been a falling off in the export, owing to the non-cultivation of the land, partly in consequence of the disturbed state of the country and partly from a falling off in the demand.

The oil obtained from the nuts is used in the same way as sperm-oil.

The trade is doubtless capable of great expansion, as there is abundance of soil; thousands of acres, which merely need the hand of the cultivator to make them teem with wealth; and if the population along the banks of the river should not be sufficient, thousands of natives would flock from the interior if there was a demand for the produce of their labour.

Of the Gambia generally it might be said that the capabilities of the soil to produce oil, nuts, seeds, &c., are unlimited. Local disturbances have constantly checked the prosperity of the settlement, but there seems to be growing up amongst the natives a disposition to avail themselves of the advantages which a cultivation of its soil offers.

There is undoubtedly an increasing community of feeling on certain points, and the self interest of the native chiefs and proprietors of the soil is teaching them the necessity of maintaining peace if they wish to extract from that soil produce sufficient to purchase articles which are becoming to them the necessaries of life.

With regard to the character of the natives, it may be asserted that those at Sierra Leone are the most progressive, loyal, and contented. Under English rule they have undoubtedly advanced both in civilization and intelligence.

On the Gold Coast the standard of morality is extremely low, and it is universally admitted that the natives will do no more work than is absolutely necessary for their subsistence.

At the settlement of the Gambia also, the habits of the population are far from satisfactory; there is a want of regular and steady industry, a carelessness and improvidence, and a great addiction to thieving and intemperance amongst them. It is from the interior of Africa, where, from their physical and intellectual superiority, the governing classes of the negro must for the future be drawn; that, after having created a demand for the fruit of their labours, we must look for the spread of that progress and civilization which is still so much needed. One of the results of the present war will doubtless be to open up the interior of the country to the trader, and to admit the natives of those parts to free access to the coast. Hitherto, all trade between the interior and the coast has been conducted by native agents, whose sole policy has been to squeeze the producer, and levy black-mail on him with a view of enriching themselves.

The climate is unsuited to the constitution of Europeans, but the soil is rich, and most productive. The capabilities of the country are admirably adapted to extensive cultivation, and the vast numbers and physical strength of the natives in the interior is, if they can but obtain free access to the trading ports, sufficient for that purpose.

W. ROBINSON, F.R.G.S.

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Reviews.

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THE VOYAGES OF THE ZENI.*

THE Arctic Regions teem with points of interest to the student of physical geography, to the physicist, and to the naturalist. But great and absorbing as are their attractions from this point of view, they do not yield to any other part of the world in the romantic character of their historical associations, and in the amount of elevating instruction that is to be derived from a study of their comparative geography. While the story of Norse adventure connects Greenland with early European history, the thrilling narratives of later Arctic explorers have made the icy capes and floe-covered sounds of the north as household words at every British hearth.

Among all the problems in the comparative geography of the Arctic Regions, there is probably none that has commanded more attention than the questions bearing on the voyages of the two noble Venetians, who visited and described so many lands with strange names in the far north, during the 14th century. Pinkerton remarked that "Zeno's book is one of the most puzzling in the whole circle of literature;" and it is certain that the investigation of the perplexities which hang about the Zeno narrative, and the map which accompanies it, has hitherto baffled every commentator.

Mr. Major has brought a critical and well-balanced mind, and a judgment long trained in the careful examination of similar puzzles, to bear on this subject. His aim has been, not only to discuss the questions at issue, but to set them at rest. He is not satisfied with an endeavour to fortify his point of view with the most telling arguments and the most exhaustive research. His plan is to demonstrate each problem, that has caused perplexity to previous writers, with mathematical precision, and to reduce the solution of the various questions to certainty. All students who bestow ordinary attention on his introduction, cannot fail to concur in the verdict that he has succeeded.

Towards the close of the 14th century, Nicolò Zeno, a member of one of the noblest and most ancient families in Venice, went on a voyage, at his own expense, into the northern seas, and was wrecked on what he describes as the island of Frislanda, which Mr. Major has proved to be one of the Færoe group. He entered into the service of a chief named Zichmni, as pilot of his fleet, and wrote to his brother Antonio, inviting him to join him, which he did. Four years afterwards Nicolò died in Frislanda, and Antonio, after a further stay of ten years, returned to Venice. The narrative of the movements of the two brothers is derived from the letter from Nicolò inviting Antonio to join him, and from letters from Antonio to a third brother, Carlo Zeno, the famous Venetian Admiral. The Zeni accompanied Zichmni in a victorious attack on Eslanda, which Mr. Major has shown to be the Shetland group. There is also an account of a visit by Nicolò Zeno to Engroneland, or the Norman settlements of Greenland; and of the observations of some fishermen in two parts of North America, called respectively Estotiland and Drogeo.

The whole story had been written out by Antonio Zeno; but a descendant of his named Nicolò, born in 1515, when a boy, not knowing the value of these papers, tore them up. Luckily some of the letters escaped destruction, and, in after life, he was able to compile and publish the narrative, as we now have it, in 1558. He also found a map, rotten with age, in the Zeno palace, and made a copy of it. But, unluckily, he supplied what he thought was requisite for its illustration, from his own reading of the letters; and his interpolations have been the chief causes of subsequent perplexity. This younger Nicolò Zeno was a Member of the Council of Ten, and a nobleman of repute and position.

Several writers, and conspicuously Admiral Zahrtmann of the Danish navy, have thrown discredit on this work, and have even accused the younger Nicolò Zeno of having concocted it himself. Zahrtmann, in an elaborate paper (*Royal Geographical Society's Journal* v., p. 102), goes so far as to argue that the whole story is a tissue of fiction emanating from the pen of Nicolò Zeno, junior, in 1558.

Mr. Major, in his closely reasoned introduction, has proved Admiral Zahrtmann to be wrong on every point, whether in his facts or his deductions, and convicts him of throwing upon an honourable man a series of aspersions of the most ungenerous character.

One of Mr. Major's rules for fixing localities which have been written down by an Italian from the lips of Northmen, is to follow the narrative strictly, and to see what names of places tally, *not in form, but in sound*, with those that have been written down. This test has never been applied before. He thus identifies the Sudero Gulf of the Zeni with Suderoe Fjord in the Færoe Islands; Ledovo and Slofe Islands, with Lille Dimon and Skuoe; Bondendon with Norderdahl; and so on. The transmutation of Færoisland, the old name of the Færoe Isles, into the Frislanda of the Zeni is obvious enough. The chief Zichmni is identified with Henry Sinclair, Earl of the Orkneys and Shetlands.

The most important part of the narrative is the account of the elder Nicolò's voyage to Greenland, when he visited and described a church and a monastery in one of the Norman settlements, and furnished other interesting particulars. This information is supplemented by a most valuable document, consisting of sailing directions and a chorography of Greenland, by Ivar Bardsen, a native of the East Bygd, and procurator of the episcopal see of Gardar, who was sent by the Bishop with succours when the West Bygd of Greenland was attacked by the Skrellings or Esquimaux. Mr. Major has enriched the volume with a translation of Ivar Bardsen, from a collation of the copy given by Professor Rafn in his *Antiquitates Americanæ* with the one in Purchas. Captain Graah, the distinguished explorer of East Greenland, argued that the Norman colony, known as the East Bygd, was really on the west coast; but, in using Bardsen as a guide, he materially weakens his authority by arbitrarily altering his landmarks. Bardsen mentioned certain rocks called Gunnbiorn's Skerries, midway between Iceland and Greenland;

* *The Voyages of the Venetian brothers Nicolò and Antonio Zeno to the Northern Seas, in the 14th century:* comprising the latest known accounts of the lost colony of Greenland; and of the Northmen in America before Columbus. Translated and edited, with Notes and an Introduction, by R. H. Major, F.S.A., &c. (Hakluyt Society, 1873.).

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and Graah, not finding them where Bardsen placed them, gives the name to some rocks close to the Greenland coast. Mr. Major has been able to restore the Skerries to their proper place as given by Ivar Bardsen. On a map of the world in the 1507 edition of Ptolemy, he has found a large island in the exact position, with the legend *Insula hæc Anno Domini 1456 fuit totaliter combusta;* and in a later map he has found a shoal laid down on the same spot, with the name of "Gombar Scheer," a sailor's version of Gunnbiorn's Skerries. In one of Jan van Keulen's charts of 1700 the soundings on this shoal are given. Having thus restored Ivar Bardsen's sailing directions to their integrity, Mr. Major demonstrates, which Captain Graah failed to do, that the East Bygd of Greenland was on the west coast.

We regret that our space will not allow us to follow Mr. Major in his equally interesting discussions respecting the visits of the fishermen to the American coast, and the position of the Icaria of the Zeni.

The actual narrative of the Zeni only covers thirty-five pages, and that of Ivar Bardsen fifteen. But the introduction is very complete, and Mr. Major, by demonstrating, beyond further possibility of cavil, that the publication of the younger Nicolò Zeno is reliable and authentic; by identifying the localities in the narrative, and explaining all the difficulties of the map, has performed a great and enduring service to geographical literature. He has restored the narrative of the voyages of the Zeni to their rightful place, as one of the most valuable chapters in the authentic history of early Arctic discovery.

EXPERIMENTAL MILITARY SURVEY OF THE RUSSIAN CONFINES IN ASIA.*

Under this modest title Colonel Veniukof publishes a volume containing 487 pages of subject matter, besides 79 pages devoted to tables of astronomical points and itineraries of routes. It is a republication of a series of articles which appeared in the *Russian Military Journal*, and which before their appearance had served as the ground-work of a series of lectures at the Military Academy. These papers, now collected into a single volume, form a useful text-book on the Russian possessions in Asia, or rather on those territories on the south-eastern verges of Siberia which Russia has acquired by treaty, appropriation, or conquest, from the period of the third decade of the present century.

This marginal territory is divided into eleven sections, which are respectively under the administrations of the Governors-General of Eastern Siberia, Western Siberia, Turkistan, and Orenburg, according to their location. Each section is treated in its entirety from a military strategical point of view as a *region* (*i.e.* an appendage to a Governorship-General), as a district, circumscription, or Governorship-General, as the case may be; and each "essay" is a compilation of all the information—statistical, orographical, geographical, topographical, hydrographical, &c.—which has been collected by travellers and by the Russian administration. The whole work, in an introductory chapter, is brought as it were under the lens of a critical review of the gradual but systematic extension of the Russian boundaries, and of the method of their defence.

Some of these articles have already been translated, as, for instance, the first, on the island of Saghalien (see *Journal of the Royal Geographical Society*, 1873), and that on Khiva (see *Bulletin de la Société Géographique de Paris*, Juin, 1873), whilst a German translation of the complete work is coming out by instalments at Leipzig.

Colonel Veniukof's work is one of those handbooks of the Russian empire which it has now become the rage to publish at St. Petersburg. Thus, for instance, the Imperial Geographical Society is engaged in bringing out the first Geographical Dictionary of the Russian empire, while various other societies are publishing the results of researches instituted in several parts of Russia Proper. By his present work, Colonel Veniukof renders an immense service to the Government of his country, for in a compact form he collates all the information amassed up to this time by travellers of numerous nationalities respecting the belt of country which girds the waist of Asia from the Caspian Sea to the Pacific Ocean. He has himself, as he observes in another work on the Russian confines, traversed between the years 1857 and 1863, a greater portion of the Imperial frontier from the Baltic to the Caucasus, and visited the Celestial (Thian-Shan) Mountains as well as the shores of the Pacific Ocean. He writes, therefore, authoritatively, and makes many original and highly interesting observations of a military-political character which have always great weight with men of real authority and influence in Russia.

La Perouse and Broughton, besides numerous other navigators, have completely surveyed the coast of the so-called "Maritime Region," between the mouths of the Tumen and Amur Rivers. The Japanese Mamia Rinso was the first to prove that Saghalien was separated from the mainland by a navigable channel, a fact which the Russians established in very recent times. The coast line is now thoroughly well known in scientific circles, although it still lacks a more popular description which would better bring its splendid scenery home to the imagination. The interior of the country, however, remains to all intents and purposes as little known as ever. Thus, although the Russians have been in possession of the country of the Amur River for more than 200 years, it is still in its virgin state of utter unproductiveness; and on every side, says Colonel Veniukof, there are tracts of land where no Russian foot has yet trodden. The southern portion of the island of Saghalien belongs to Japan, and the northern part to Russia; it is supposed, however, that the Russian Government is taking measures to secure possession of the whole island, with the idea of establishing a penal settlement in the more favoured southern portion of it. A writer in the *Ost See Zeitung* says that an equivalent in money will be offered to Japan, and that lamentable consequences will follow if it be not accepted. The fisheries in these waters are doubtless worth having—for the Japanese catch shoals of fish off the coast simply with their hands—while, according to one account of a voyage in those seas, the whales are so numerous that great care must be taken in approaching the beach lest the boat be upset by those monsters. As for the idea of forming a Russian penal settlement at the southern extremity of Saghalien, we

* Opyt Voënnago Obozrenia Rouskikh Granitz v. Azii.

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have no faith in the success of such an undertaking, if it really be in contemplation; for the same process has entirely failed on the Amur and elsewhere. The announcement of such a project may be regarded only as a device to smother the susceptibilities of foreign nations, which might be aroused by the summary creation of a naval station in Anniva Bay or thereabouts. Mr. Ravenstein published, in 1861, a very excellent and interesting book, entitled *The Russians on the Amur*, which gave a great deal of information on the subject dealt with in the first two "Essays" in Colonel Veniukof's present volume.

The immense length of the Imperial frontier in Asia, which is about 7000 miles, coupled with the fact of the diversity in the physical character of the various localities along that line, as well as with that of the great varieties of races inhabiting the borders, naturally calls for a separate review of each section of that boundary. At the same time, as Colonel Veniukof observes, the political relations of the various neighbouring countries are likewise as diverse as the economical and other interests of each separate section of the line of frontier. "It is very evident" he says, "from a military point of view, that *all* the Russian Asiatic possessions cannot form *one* theatre of war in which a *single* commander-in-chief could operate with a *single* object." Accordingly, Colonel Veniukof examines each section of the frontier line as a distinct theatre of war.

The most interesting portions of this work are perhaps those on Manchuria and on those other portions of the Imperial frontier which remain almost completely open—that is, where nature offers no impediment to further advances.

Manchuria is treated by the author in its entirety, "because, owing to the natural wealth of that country, and its importance to China, it is capable of forming the basis of serious aggressive operations against Russia." The Trans-Baikal, or Khalka section of the line, has a peculiar interest from the fact that while the Russian side of the frontier is occupied by a settled population, the Chinese side is peopled by nomadic races, a circumstance which leaves the frontier practically open. The Altai Sayan section is fortunately protected by a mountain region which it is difficult to traverse, whilst on the other hand the Dzungarian section is intersected by transverse ranges, leaving easy passages from south to north, or *vice versa*. This is also a noteworthy section of the line.

It is followed by the Thian-Shan section which abuts on Eastern Turkistan. As the latter country is a state of considerable power, and has even established political relations with British India, the adjoining Thian-Shan section of the Russian frontier has been analyzed by Colonel Veniukof, topographically and ethnographically, in its entirety from a military strategical point of view.

Colonel Veniukof has also worked into shape all the dry materials relating to the countries which compose the Governorship General of Turkistan (divided into two sections; the mountainous district and the Aral or Steppe district). The Turcoman or Trans-Caspian section is separately considered. Particular attention is paid to the mountain passes and routes, to the nature of the soil, the climatology of the countries, the political character of the population, and to the military forces centred in the various localities. On all these points Colonel Veniukof does not pretend to give more information than is strictly necessary to the staff officers whom he instructs.

We cannot do justice to the entire work in a single article, and shall only in this first notice quote some of the most interesting passages which occur in Colonel Veniukof's introduction and in the notes to it.

Referring to the early establishment of Cossack settlements along the Russian frontier in the East, the author says, in a note—The fact of the gradual substitution of Cossack troops by regular forces is a matter of deep historical significance. It is to be taken as an evidence of the supremacy of state principles over popular interests, and of the systematic absorption of the liberties and privileges of individual elements in the body politic by its administrative centre. With the loss of their privileges, the Cossacks have lost that dash and spirit of enterprise which, in the 17th century, led to their conquest of fresh countries, and enabled them to retain those conquests without any assistance from the State. The Government has been consequently obliged to take upon itself the gradual colonization of the annexed lands, the extension and defence of the frontiers, whilst it found itself also obliged to set up authorities foreign to the soil. Here Colonel Veniukof puts the following significant question.—"What has Russia gained by thus changing the character of the forces with which she operates in the extension of her dominions, before reaching her inevitable frontiers in Asia?" In another part he observes that "the acceptance of the offer of submission made by Abul Khair, Khan of Khiva, in the year 1732, created the absolute necessity of penetrating into the innermost depths of Central Asia, in order that sooner or later our frontier may pass along the Hindu Kush and the mountains of Khorassan."

He frankly acknowledges that the various expeditions undertaken by the Russian Government, between the years 1834 and 1853, were undertaken in pursuance of a policy adopted at that time in official circles under the influence of a desire to compete with England. With reference to Colonel Veniukof's observations as regards Dzungaria and Eastern Turkistan or Kashgaria—the ruler of which latter country is regarded by Russia as a rebel and a mischievous propagator of Islamism—but with whom our envoy, Mr. Forsyth, has been lately negotiating a treaty of amity and trade, we find the following passages:—

"The experience of many years has taught us that, in order to preserve tranquility within our own dominions, it is necessary for us to extinguish the flames of rebellion in conterminous countries (Dzungaria); the interest of both empires (China and Russia) with respect to the barbarous people of Central Asia are perfectly identical, and call alike for the disarmament and pacification of those barbarians."

"The Kokand adventurer, Yakub-Beg (of Kashgar), relying on our peaceful temper, lost no time in taking up a strong position in Urumtsi, *i.e.*, at a point north of the Thian-Shan, with the direct and distinctly declared object of establishing a Mussulman State over the ruins of a Chinese supremacy. At the same time he is entering into a friendly intercourse with British India, whence he is supplied with arms and with military instructors."

ROBERT MICHELL.

(To be continued.)

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THE INDIA DIRECTORY.*

"Is not London very empty and dull when the fleet sails?" asked a yamstalk young lady of an officer of the celebrated China fleet, then riding in all the pride of power and numbers at St. Helena—and this within the memory of many now living—and the question, simple and silly as it may appear, is only an exemplification of ideas by comparison; and although the glory of the great and mighty Honourable John Company is a thing of the past, the flag of Captain James Horsburgh, F.R.S., one of that ilk, still flies, to attest that it is still of the present or rather a connecting link between the past and the present, and to show that the school in which he was educated is not to be readily forgotten, and that although fleets may pass away and monopolist companies succumb to the advance of civilization and demands of the ever changing times, some landmarks are still left to denote their former glory.

To a maritime nation such as this, the very name of Horsburgh has become a "household word;" indeed, so much so, that to ask for an "India Directory" would raise a doubt, but to ask for "a Horsburgh," the man would be considered hopeless who did not at once understand what was needed; and time was when a vessel bound East would as soon have thought of leaving the sheet anchor behind as to start without a "Horsburgh."

But the times that have changed fleets and companies have also necessitated a change in the "Horsburgh." The Suez Canal would cause the young lady above quoted to consider that the glory of her own dear little island home had indeed departed, when scarcely a single vessel bound to or from China or the East Indies ever touched at the island, and we almost doubt if the late hydrographer of the late Honourable East India Company would have known his own work. The title page would startle him with its allusion to steamers; the first section would puzzle him exceedingly, for the Mediterranean as a road to the east would indeed be foreign to him, and the tracks laid down for vessels would be equally puzzling to one unacquainted with the mighty power of steam, cheating as it does monsoons and trade-winds and defying the power of calms to detain. Still, with all its changes, there is the same groundwork, the same indefatigable research apparent, and the same name, and, we may add, a little too much of the original work for the said change of times and methods of navigation.

The origin of this remarkable work may be considered to have been a few disjointed memoirs of different parts of the route to India, published, in 1805, under the title of "Memoirs: comprising the Navigation to and from China by the China Sea, and through various straits and channels in the Indian Archipelago."

This was followed, in 1809, by the first part of the Directions for Sailing to and from the East Indies, China, New Holland, Cape of Good Hope, and the interjacent ports; and Part ii. appeared two years after. These two volumes were in quarto, and contained between four and five hundred pages each, with the index. The labour bestowed on the work must have been enormous; but the store of accumulated treasures from the well-informed men who were continually passing to and fro over the same ground, and whose journals were literally the stones by which the goodly edifice was raised, was rich in the extreme; and so honest was the compiler that the praiseworthy desire to give every man his due, led to a prolixity, which however well intentioned was cumbrous to the work, and detrimental to its utility. At the same time it is to be wished that many subsequent writers of directories had as generously acknowledged their indebtedness to "Horsburgh" even at the risk of being prolix.

Many parts of the original work read strange, and even the proper names then used have undergone transmutation. We read of Scindy, Sincapour, and Typhoongs, for Sind, Singapore, and Typhoons; but it would not do to be critical in the matter of proper names, as we are by no means determined even at the present day as to whether the names should be inserted on our charts and in our directories as they are spelt, or as they are pronounced. With this digression, we resume our notice.

"Horsburgh" has passed through eight editions, in its original form, under different editors, who added considerably to its bulk without sufficiently curtailing the original matter, and thus the last edition attained a size of nearly double the number of pages of the original work, and became so bulky and prolix, that it may be said to have died of obesity. That great art in Sailing Direction writing, viz., terse language and short paragraphs was entirely lost sight of, for it not unfrequently happened that a paragraph ran to a page and a half, and that in folio; then the vague expressions were handed down, such as a rock being described as lying "at the distance of a musket shot from the shore," "a sail's breadth," &c., terms that have become obsolete, and which from their vagueness were not disused before it was time.

The work before us is still "Horsburgh," an old friend with a new face. Captain Taylor has, however, done his work well in his regeneration of the work, by breaking up the old type, adopting the system of brief paragraphs, dropping the marginal references or notices, and introducing abbreviations well understood by seamen, and also by block-printing names and words of importance, to catch the eye, and also in generally omitting the authorities which, as before remarked, rendered the work cumbrous.

The system of sections is also a great improvement. Of course the opening of the Suez Canal necessitated a notice respecting the navigation of the Mediterranean; and we are free to confess we should have thought it advisable greatly to have extended this second chapter of the first section, for even steamers will at times break their shafts, or otherwise get disabled, or run short of coal, and this chapter leaves them greatly to shift for themselves.

Once out of the Mediterranean, Captain Taylor is in his own domain, the Red Sea, the directions for which are terse and succinct. Of the matter of the "Horsburgh" proper, of the work, much has been left as it was, excepting in the alterations alluded to, and it may be added much more might still have been omitted with advantage; and in proof, we may adduce the table of the limits of the Atlantic trade-winds, pages 44 to 48, the wind charts published having quite superseded the necessity of such a table. Again

* *The India Directory:* Part the first, founded on the work of the late James Horsburgh, F.R.S., by Commander Alfred Dundas Taylor, F.R.G.S., late Indian Navy. (W. H. Allen and Co.)

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in page 438 we have "Practical Hints about Compasses," which to any commander of ordinary intelligence would be useless, and even if of use, it is out of place and should have been in the introduction, under the head of "Deviation or Local Attraction."

Our concluding word, however, will be one of commendation for the nicely executed maps introduced, and also for the copious index, which greatly increases the value of the work. We can only wish as much success to the new launch, under the new flag, as was attained by the old.

THE SAILOR'S POCKET BOOK: a Collection of Practical Rules, Notes, and Tables, for the use of the Royal Navy, Mercantile Marine, and Yacht Squadrons. By *Commander* A. C. D. *Basford*, R.N., H.M.S. 'Agincourt.' (J. Griffin & Co., Portsea, 1874.)

This is a most useful little hand-book, and in 334 small pages contains an amount of information on various points, daily required by seamen, which is really astonishing. The object is attained by much thought and careful selection, which shows much care and the devotion of no small amount of time and trouble. But the result is more than successful, and Captain Basford has done a good service. The book, which has cost a year's [illegible] tables for magnetic angles, a table for [illegible] and information respecting [illegible] The second section is on the compass, with [illegible] The third section is extremely [illegible] The fourth section, on the [illegible] The fifth section, on [illegible] The sixth section, on [illegible] The seventh section, on [illegible] The eighth section, on [illegible] The ninth section, on [illegible] The tenth section, on [illegible] The eleventh section, on [illegible] The twelfth section, on [illegible] The thirteenth section, on [illegible] The fourteenth section, on [illegible] The fifteenth section, on [illegible] The sixteenth section, on [illegible] The seventeenth section, on [illegible] The eighteenth section, on [illegible] The nineteenth section, on [illegible] The twentieth section, on [illegible] The twenty-first section, on [illegible] The twenty-second section, on [illegible] The twenty-third section, on [illegible] The 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such as cotton, wool, silk, hides, cattle, dried fruit, and dyes; while the imports, which are almost exclusively Russian, are increasing, and will in course of time create an invaluable market for Russian manufacturers.

Viewed as a whole, this work appears to us of value in its first and second parts, which treat of the author's experiences and observations in his travels; but in the third part, where he launches into the political aspect of the Eastern question, he is a little out of his depth, through an insufficient acquaintance with the subject.

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AN OUTLINE OF THE THEORY OF THE GREAT OCEAN CURRENTS. By *Captain N. Schilling, of the Imperial Russian Navy.* (St. Petersburg, 1873.)

CAPTAIN SCHILLING, of the Russian Navy, has published a pamphlet in which he gives in outline the theories which have been put forward with respect to the great currents of the ocean and the prevailing winds. He attempts to reduce to a general formula the theories on this question which have been propounded by authorities of the past and present generations, and comes to the conclusion that none of the explanations which have hitherto been given of these phenomena are in any way consistent with the facts. The oceanic and atmospheric currents are subject to general laws, and the equilibrium of the water of the ocean as well of the atmosphere is disturbed by common causes which Captain Schilling classifies thus:—

1. The variations in the specific weight of the water and atmosphere.
2. The revolution of the earth round its axis.
3. The attractive forces of the sun and moon.

Captain Schilling does not believe that the equatorial currents are produced by prevailing winds (trade and anti-trade), although he thinks that those winds may somewhat increase the rapidity of these surface currents; and while admitting that "we have not yet arrived at a satisfactory solution of this question," he endeavours to prove by illustrations that the constant currents which flow parallel with the equator, and with intermediate zones of still water, are attributable exclusively to the attractive influences of the sun and moon.

"With respect to the trade-winds," says Captain Schilling, "we observe that they also in their main features fall in very well with the deduction from our hypotheses, although in some instances, as for example in the change of zone of the trade-winds it may be observed that the sun does not exercise an influence in combination with that of the moon. At the same time, as the attractive power of the moon is greater than that of the sun, we must conclude that the heat of the sun also affects the trades, in accordance perhaps with Harvey's theory, or through the agency of the vapours which have generally an immense influence over all atmospheric phenomena."

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NOTE ON THE VALLEY OF CHOOMBI. By *Dr. A. Campbell, late Superintendent of Darjiling* (Paper read before the Royal Asiatic Society).

WHEN Dr. Hooker and Dr. Campbell were exploring the Sikim Himalayas, they attempted to enter the valley of Chûmbi by the Chola Pass (14,900 feet above the sea), but were stopped by a Chinese official with a military escort. No European has ever visited the valley itself, although Dr. Campbell has described the route to it from Darjiling, and from it to Lassa. In the present paper he gives some account of the valley, which lies in the Eastern Himalayas, and on the road from Darjiling to Lassa, between Sikim and Bûtan. It forms a useful addition to what is known of the border lands between India and Tibet.

SIMLA METEOROLOGICAL OBSERVATIONS.

THE first volume of a valuable series of meteorological observations taken at Simla by Major-General J. T. Boileau, F.R.S., during the years 1841 to 1845, has been published by order of the Secretary of State for India in Council. It embraces the observations of the several meteorological instruments taken at intervals of two hours during the years 1841 and 1842, and of one hour during the years 1843 to 1845; also observations of Daniell's Hygrometer, and of the dry and wet bulb thermometers taken daily at the four six-hourly periods, 4h. 29m. and 10h. 29m. A.M. and P.M., mean time at Simla, being the magnetic hours of mean time at Göttingen nearest to the periods of maxima and minima at Simla (3 and 9 A.M. and P.M.) as directed in the instructions issued by the Royal Society in the year 1840.

The hourly and daily means of all the instruments observed and the results will be given in a separate volume, which may be expected to be published in the course of the ensuing autumn.

The value of an extended and complete series of observations taken at an altitude of 8000 feet is very great, while it is enhanced by the fact of their being one of the most complete and carefully made records ever taken. Copies of the work will be placed in the hands of the principal observers in India, as the acknowledged growing importance of the science in that country renders it desirable to bring together observations recorded over as extended an area as possible.

EAST AFRICAN SLAVE TRADE.

AN interesting lecture on the East African Slave Trade was delivered on Wednesday, the 18th instant, at Leamington, by Major Euan Smith, C.S.I., who in his capacity of private secretary to Sir Bartle Frere, in the recent Zanzibar Mission, had ample opportunity of gathering experience and forming an accurate judgment on the odious traffic from every point of view. The lecturer gave a sketch of the various steps which had been made towards an abolition of the East Coast Slave Trade, and which culminated in the appointment of the Zanzibar Mission. True, the treaty placed before the Sultan was not signed till after the Mission had left, but the prescient eye of its chief never doubted of its ultimate success, and the result justified his judgment. Major Smith laid, however, especial stress on the vital necessity of following up the first step with vigour and decision. The inaction resulting from the recess and the prorogation of Parliament had had a mischievous effect, the Arabs were re-organizing the land route along the coast and a strong squadron in those waters was urgently needed.

A graphic, but certainly not overdrawn, description of the now happily closed Zanzibar Slave Market was given, while the lecturer did not omit to mention a happy augury of better times in the fact that a church is now being built on the very site of the old slave market.

The Mission visited Madagascar, and Major Euan Smith evoked a hearty laugh by a humorous description of the extraordinary costumes adopted by the higher officials in the island, as well as by their indiscriminate use of British words of command in military evolutions. It may be observed *en passant*, that these phrases seem to have an extraordinary attraction for semi-savage warriors. Even in countries remote from British intercourse, the words of command used in our army are caught up and eagerly adopted.

The lecture, which was illustrated by a large diagram map of Africa, lent by the Royal Geographical Society, was listened to with deep interest, and a cordial vote of thanks was passed to Major Euan Smith on its conclusion.

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Bibliography.

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HANDBOOKS.

STOESSNER (Dr. E.) Elemente der Geographie in Karten u. Text methodisch dargestellt. Parts 1 and 2. 25 maps. Annaberg, 1874. 4s.

RECLUS (O.) Géographie. 18mo., pp. 790. Paris, 1873.

RITTER'S geographisch-statistisches Lexikon. 6th edition, by Dr. O. Henne-am Rhyn. Leipzig, 1874. In parts at 1s. 6d. each.

GREGOIRE (L.) Géographie physique, politique et économique de la terre (moins l'Europe). Asie, Afrique, Amérique et Océanie. 18mo., pp. 488. Paris, 1874.

PHYSICAL GEOGRAPHY.

HOCHSTETTER (F. v.) Geolog. Bilder der Vorwelt u. Jetztwelt. 24 illustrations. Folio, pp. 37. Esslingen, 1873. 9s.

DORR (Dr. R.) über das Gestaltungsgesetz der Festlandsumrisse u. die symmetr. Lage der grossen Landmassen. 8vo., pp. 164. Liegnitz, 1873. 3s.

WIEBEL (Prof. K.W.M.) die Insel Kephalonia u. d. Meermühlen von Argostoli. Versuch einer Lösung dieses geo-physik. Räthsels. Map. 4to., pp. 170. Hamburg, 1874. 6s.

SCHMICK (Dr. J. H.) das Flutphänomen u. sein Zusammenhang m. den säkularen Schwankungen des Seespiegels. Illustrated. 8vo., pp. 216. Leipzig, 1874. 8s.

SURVEYING AND PRODUCTION OF MAPS.

PATERSON (Major). Notes on Military Surveying and Reconnaissances. 8vo. London, 1873. 4s. 6d.

GALLOZZI (Major G.) and D'AMATO (Lieut. N.) Corso elementare di topografia militare con esercizi sulla lettura della carte topografiche. 8vo., pp. 188. Lecce, 1873.

BARTHAUD (M.) Notice sur le lever des plans cotés an tachéomètre. 8vo., pp. 8. Paris, 1873. 1s. 8d.

FRANCE.

MONTEGUT (E.) Tableau de la France. Souvenirs de Bourgogne. 18mo., pp. 414. Paris, 1874. 3s.

JOANNE (A.) Géographie du département de l'Allier. Map. 29 illustrations. Paris, 1874. 8d.

JOANNE (A.) Géographie du département de Saône-et-Loire Map. 24 illustrations. pp. 64. Paris, 1874. 8d.

JOANNE (A.) Géographie du département du Nord. Map and 48 illustrations. 12mo., pp. 58. Paris, 1874. 8d.

BURAT (A.) Géologie de la France. 8vo., pp. 592. Paris, 1873.

STATISTIQUE DE LA FRANCE. 2nd serie t. 21. Population, Dénombrement de 1872. 4to., pp. 290. Paris, 1873.

TABLEAU GENERAL du commerce de la France 1871. 4to., pp. 749. Paris, 1873.

KLEINE (E.) Géographie physique, politique, agricole et commerciale de la France. 6 maps. 12mo., pp. 624. Paris, 1873.

BOGROS (E.) A travers le Morvand, moeurs, types, scènes et paysages. 8vo., pp. 242. Château-Chinon, 1873.

STATISTIQUE des pêches maritimes, 1872. 8vo., pp. 132. Paris, 1874.

METZ (A.) Annuaire du commerce d'exportation et d'importation de Paris, 1873-4. 8vo., pp. 455. Paris, 1873.

CAFFIAUX (H.) Essai sur le régime économique, financier et industriel de Hainaut, après son incorporation à la France. 8vo., pp. 512. Valenciennes, 1873.

GIROD (E.) En chemin de fer de Vesoul à Besançon, itinéraire historique, descriptive et statistique. Map. 18mo., pp. 340. Vesoul, 1873. 2s. 6d.

RECLUS (Onésime) Géographie de la France et de ses colonies. 18mo., pp. 178. Paris, 1873.

GERMAN EMPIRE.

FRIEDRICH (Dr. O. O.) Geognostische Beschreibung der Süd-Lausitz u. der angrenz. Theile Böhmens u. Schlesiens. Map. 4to., pp. 100. Dresden, 1874. 2s. 9d.

BESCHREIBUNG des Oberamtes Brackenheim. Hsg. von statistischtop. Bureau (Würtemberg). Mapand views. 8vo., pp. 458. Stuttgart, 1874. 4s. 3d.

STATISTIK des deutschen Reiches, hsgn. vom Kaiserl. stat. Amte. 3 Band (Foreign Trade, 1872). 4to., pp. 378. Berlin, 1873. 9s.

BEITRAGE zur Statistik d. Königr Bayern. Hsg. v. stat. Bureau. Heft 27 (Educational Statistics, 1869-72, by Dr. J. Mayr, pp. 350). 16s. Heft 28 (Census of 1871; population of parishes, pp. 270). 5s. 3d. Munich.

HACK (C.) Statist. Mittheilungen der Stadt Mülhausens 1872. 8vo., pp. 160. Mülhausen, 1874. 4s.

JAHRBUCH für die amtliche Statistik d. bremischen Staats. Hrsg. v. d. Bureau für Statistik. 6th year, Part II. (Miscellaneous Statistics for 1872, with a hypsograph map. 4to., pp. 248. Bremen, 1874. 7s. 6d.

WANDERUNGEN durch Deutsch-Lothringen. Kurzer Beitrag zur neueren Landeskunde. 8vo., pp. 116. Stuttgart, 1874. 1s. 6d.

AUSTRIA.

OESTERREICHER (Capt. T.) Die Oesterreich. Küstenaufnahmen im Adriatischen Meere. Im Auftrag d. Reichskriegsmininisterium. 5 Plans. 8vo., pp. 216. Triest, 1873. 3s. 4d.

AUSWEISE über den auswärtigen Handel der Oesterreichisch ungarischen Monarchie, 1872. Hsg. v. d. stat. Central Commission. 4to., pp. 294. Vienna, 1874. 6s.

SWITZERLAND AND ALPS.

SCHWEIZERISCHE Eisenbahnstatistik, 1868. Hrsg. vom Stat. Bureau. 4to., pp. 142. Map. Zurich, 1874. 6s.

JAHRBUCH des oesterreichischen Alpen-Vereins. Vol. IX. 5 Maps. 8vo., pp. 432. Vienna, 1873. 10s.

ZITTEL (E.) Rings um die Jungfrau. Touristenblätter aus d. Berner Oberlande. 16mo., pp. 164. Karlsruhe, 1874. 3s.

ITALY.

GREGOROVIUS (F.) Wanderjahre in Italien. 2 vols. 8vo., pp. 734. Leipzig, 1874. 12s.

AUSSERER (Rev. P.) Pilger-Führer oder Wegweiser nach Rom u. durch d. Heiligthümer d. Heil Stadt. Map. 8vo., pp. 552. Mayence, 1874. 6s.

STATISTICA del commercio speciale 1873, pubbl. dal Minist. delle finanze (Dir generale delle gabello). 4to., pp. 30. Florence, 1874.

STATISTICA giudiziaria penale del Regno d'Italia, per 1870. Folio pp. 780. Rome, 1872.

STATISTICAL del regno d'Ialia. Popolazione e moviments dello stato civile nell' anno 1870, comp. per cura del Min. d'agricoltura, industria e commercio. 4to., pp. 392. Mican. 1872.

ANNALI del Ministero di agricoltura industriae commercio, 1873. I Trimestre, vol. 63 (Industria a commercio). 8vo., pp. 186. Rome, 1873.

CINQUINS (A.) Cenni Storici e geografici d'Italia sull' età media e moderna ad uso delle scuole liceali. 2 parts. 8vo., pp. 512. Biella, 1874.

MUZZI (S.) Vocabolario geografico-storico-statistico dell' Italia nei suoi limiti naturali. In parts, 8vo., pp. 64 each. Bologna, 1873. 1s. 8d. a part.

STATISTICA del Regno d'Italia. Movimento della navigazione nei porti del Regno, 1871. 4to., pp. 144. Florence, 1873.

STATISTICA del Regno d'Italia. Amministrazione publica. Bilanci provincials, 1871-2. 4to., pp. 32. Rome, 1873.

STATISTICA del Regno d'Italia. Istitute di previdenza casse di risparmio, 1868. 4to., pp. 122. Rome, 1873.

SPAIN.

DOUSSEAU (A.) Grenade. 8vo., pp. 155. Map. Le Havre, 1873.

GREECE.

TOZER (Rev. H. F.) Lectures on the Geography of Greece. Map. 8vo., pp. 420. London, 1873. 9s.

ASIA.

LUBOMIRSKI (Prince J.) Un nomade, Safar-Hadgi. Les Russes à Samarkand. 12mo., pp. 328. Paris. 1873. 2s. 6d.

WIJK (J. E. van der.) Aardrijkskundige beschrijving van Java. 2e. vermeerderde druk, Map. 8vo., pp. 232. Zalt-Bommel, 1874. 2s. 6d.

SEPP (Dr.) Jerusalem u. das heilige Land. Pilgerbuch nach Palaestina, Syrien, u. Aegypten. 530 illustrations and maps. 2nd edition. Schaffhausen, 1874. In parts at 1s. 3d.

STARK (K. B.) Nach dem griechischen Orient. Reise-Studien. Map. 8vo., pp. 420. Heidelberg, 1874. 7s. 6d.

ROESLER (Rob.) die Aralseefrage noch einmal geprüft. (Repr. f. Proceedings of Vienna Ac.) 8vo., pp. 88. Vienna, 1874. 1s. 5d.

DESCRIPTIONES terrae sanctae ex saeculo VIII, IX, XII et XV. S. Willibaldus. Commemoratoriumde casis Dei. Bernardus Monachus. Innominatus VII. Johannes Wirziburgensis. Innominatus VIII. La Citez de Jherusalem Johannes Poloner Nach hand- u. druckschriften hrsg. v. Titus Tobler. 8vo., pp. 539. Leipzig, 1874. 16s.

STUMM (Lieut. H.) Aus Chiwa. Berichte. 5 maps. 8vo., pp. 136. Berlin, 1873. 4s.

WEIL l'Expedition de Khiva. 12mo., pp., 72. Paris, 1874.

AMERICA.

POUSSIN (Major). Les Etats-Unis d'Amérique. Moeures usages et coutumes politiques. Force militaire, &c. 8vo., pp. 144. Paris, 1874.

MISSIONSGESCHICHTE in Heften (by Rev. Schwarzkopff). Heft 8, Labrador. 8vo., pp. 88. Berlin, 1874. 4d.

MARCEDO (M. de). Notices on the Chorography of Brazil. Translated by H. Le Sage. London, 1873. 9s.

ARCTIC REGIONS.

BATES (H. W.) The second German Polar Expedition, in 1869-70, under the command of Captain Koldewey. 8vo. Maps and Illustrations. London, 1873.

AUBEL (H. u. K.) Ein Polarsommer. Reise nach Lappland u. Kanin. Map and Woodcuts. 8vo., pp. 424. Leipzig, 1874. 8s.

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Cartography.

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Pissis's Topographical Map of Chile.*

THE thirteen sheets of Aimié Pissis's map of the Republic of Chile are now before us, and although they do not perhaps respond to the rather pretentious title under which they appear, they must nevertheless be looked upon as an important and welcome addition to our geographical knowledge of South America M. Pissis, already favourably known through a number of geographical and geological works, was charged, in 1848, by the Government of Chile, to conduct a survey of their territory. He lost no time in setting about this task, but the funds which the Chilean Government voted for the purpose were far from adequate, and instead of having under him a numerous staff of efficient assistants, capable of surveying within a reasonable time, and in a satisfactory manner, a country so extensive and offering so many physical difficulties, M. Pissis was fain to enter upon his gigantic task with two assistants only; and with this inadequate help he worked on until 1855, when an astronomer and three additional surveyors, trained at the Engineering College at Santiago, were placed under him. But even then his means were small for the task set, which was actually completed in the course of little over twenty years. Looking at the time and resources available, a regular trigonometrical survey, such as we are accustomed to in Europe, could certainly not have been produced, especially as a geological survey was to be conducted simultaneously with the topographical one. M. Pissis therefore felt constrained to content himself with a mere sketch survey. He measured, however, five base lines, varying in length from 2000 to 3300 feet, and, making use of conspicuous mountain summits in lieu of trigonometrical signals, he carried a series of triangles from lat. 27° S., down to lat. 38° S. determining in this manner eighty-one positions of the first order with sufficient accuracy. This work, as well as the detail survey of the northern portion of Chile, was completed in 1865. It was found impossible, owing to the absence of conspicuous landmarks, to extend the triangulation further south, and the map of the rest of the country, down to lat. 42° S., is therefore based upon a number of latitudes determined astronomically, and of longitudes obtained by chronometer expedition despatched from the observatory of Santiago. The detail surveys were made on a scale of 1:100,000. They do not however extend to the more remote parts of the country; and Aurauco in particular, as well as a large portion of the southern provinces, appears to have been laid down merely from oral information. Nor need this be wondered at; for, by distributing the area delineated amongst the members of the surveying staff every one of it, including the director and the astronomer, was called upon to map on an annual average, no less than 760 square miles. The survey has been published on a scale of 1:250,000, which is amply sufficient, looking to the nature of the survey and the spare population of the country. The map shows two classes of roads, the boundaries of provinces and departments, railways and mines. The geological formations are merely indicated by letters, but an edition, coloured geologically, has no doubt been issued, though we have not seen it. A sombre tint, similar to that with which our Admiralty Charts have familiarised us, is spread over the whole of the map; the object of this, to our mind, is not apparent, except it be to hide the nakedness of the land, for the paucity of details and names in many parts of the map is most striking. The delineation of the ground—that stumbling-block of so many topographers—is far from successful. We do not quarrel with the introduction of an oblique light, but should have expected that the Andes and the coast range with the longitudinal Llano intermedia bounded by them, which constitute so marked a feature of the geography of Chile, would have been brought out in a more striking and characteristic manner. M. Pissis, however, is probably not chargeable with this failure, which may be due to want of skill and intelligence on the part of the engraver, and is compensated for, to some extent, by the large number of altitudes scattered over the map. More serious, to our mind, is the frequent neglect of surveys carried on and information collected by competent persons not officially connected with M. Pissis's enterprise. This neglect is particularly observable with respect to the coast-line, which might certainly have been laid down more accurately, especially in the southern provinces. The surveys of Captains Gormaz and Señoret (not to mention the older surveys of Fitzroy and King), published in the Memorias annually presented to the National Congress by the Minister of Marine; the labours of Philippi, published in the Annals of the University of Chile and other periodicals since 1842; the researches of Frick, which appeared in *Petermann's Mittheilungen* for 1864; Rosetti's survey of a railway route over the Planchon Pass, as well as other explorations of some importance—these all have remained unnoticed, or have been noticed only in a superficial manner. Whether the differences found in latitude and longitude of places along the coast, as compared with our own Admiralty Charts, are to be accounted as errors committed by older observers, can be decided only after M. Pissis shall have published the full report on his labours, upon which he is now engaged.

But in spite of the deficiencies pointed out, the work before us marks a decided step in advance of our knowledge of the geography of Chile. To recognise this fact, we need only compare Pissis's map with that published by Gay in 1854, or with the map compiled from materials collected by the United States Astronomical Expedition to the Southern Hemisphere, under Gillis. Chile, which occupies so respected a position amongst the Spanish Republics of South America, will, no doubt, advance upon the path she has entered upon; and this first essay of a topographical map will be followed, at no distant date, by a survey conducted with larger resources and in a more exhaustive manner. To M. Pissis we shall always feel indebted for the work he has completed under difficulties of no ordinary nature, and within such a short space of time. *Bis dat qui cito dat* fairly applies to him, and the gold medal bestowed by the Geographical Society of Paris in recognition of his services to geographical science has been richly deserved.*

Indian Famine Relief Map.†

THOSE amongst our readers who desire to follow the reports of the special correspondents of the daily papers despatched to the famine-stricken districts of India cannot do better than purchase the map the title of which is given below. It is a skeleton map of the Patna Division, comprising the districts of Sarun-ghumparun, Tirhut, Shahabad, Behar, and Patna, and exhibits the administrative boundaries, the canals, roads, tanks and reservoirs. What renders it particularly interesting at the present moment is an indication of the grain-stores and depôts, and of the new roads which it is proposed to construct as "Famine Relief Works." These latter are no less than 700 miles in length, and their completion must ultimately prove of great benefit to the country, by fur-

* Plano topografico y geologico de la republica de Chile levantado por orden del gobierno e bajo la direccion de A. Pissis. Scale 1:250,000. Engraved and printed at Paris. No date.

* We may mention here that a reduction of the northern sheets of this survey has appeared in *Petermann's Mittheilungen* for 1870, and that Dr. H. Kiepert has published a map of Chile in the Berlin "Zeitschrift" for 1859, in which have been embodied the materials available up to that date.

† Skeleton Map of the Patna Division. Famine Relief. Scale 8 miles to the inch. Calcutta, February 1874. London: Trübner & Co., Allen & Co., King & Co., and E. Stanford. Price 2s.

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nishing an outlet for its produce, and affording means of access to the most remote districts, should a disaster similar to that which now threatens to decimate its population overtake it at some future time.

Maps of the United States.

EVER since the termination of the deplorable civil war in the United States the exploration of the vast territories of the West has been resumed and carried on with unflagging vigour. Any doubt respecting the progress actually made within the last ten years will be removed if we compare one of the best maps of the Union, published about 1865, with the beautiful six-sheet map of the United States just issued from Perthes's geographical establishment.* Dr. Petermann has put forth in this map the whole of his skill as a cartographical delineator; he has produced a work of sterling value which fascinates not only on a cursory glance, but bears the test of a closer examination. For the first time, perhaps, we are presented by him with a conscientious delineation of the grand physical features of a considerable portion of the North American continent, and though full of detail, his map, owing to a skilful arrangement of facts, leaves little to be desired as regards clearness.

But nothing can stay the irresistible progress of the Far West. Even whilst Petermann's beautiful designs were in the hands of the procrastinating engraver, whilst the finished plates passed through the printing press, and the printed copies through the hands of the colourer, thousands of immigrants turned their backs upon Europe to take up their abode upon the new continent. The old towns increased in population, fresh settlements were established in places hitherto the haunt of the Red Indian, railways and roads penetrated regions where only slowly-travelling trains of waggons had been seen before, explorers crossed portions of the country not visited hitherto except by the trapper, and the geologist's hammer resounded upon rocks to elicit information respecting the history of the country and its mineral resources. Every step in advance enlarged our geographical knowledge, and this at a rate which far outstrips the progress of the graver of our toiling artizan. And thus it happens that, even at the date of publication, maps of so progressive a country as the United States do not fully represent the present state of our geographical knowledge concerning it. If any proof were wanted in support of this assertion it would be furnished by the fact of our being called upon to notice, simultaneously with the completion of Petermann's work, the publication of two American maps, which throw a fresh light upon portions of the United States' territories. In Europe we are accustomed to the geologist following in the track of the topographical surveyor. In the United States the two offices are not unfrequently combined, and the geologist is called upon to explore the mineral resources of regions the geography of which is but imperfectly known, if at all. Hence, in order to render his geological reports intelligible he is compelled to make a survey of the country under exploration, and for this reason the American geological reports, looked at from a purely geographical point of view, possess an interest which our European geological surveys do not. To this circumstance we are indebted for the maps now under notice. Professor J. D. Whitney has been engaged upon the geological survey of California ever since 1860. The civil war retarded the progress of his work, but did not entirely stop it, and, having published a series of magnificent volumes, illustrating his and his assistant's labours, he now presents us with a map of California and Nevada,† which exhibits, within a small compass, the results of his topographical surveys. The map, as far as California is concerned, is based upon the state geological survey, and the United States coast and land surveys. Nevada is delineated from the survey of the fortieth parallel under C. King, from the explorations of the U. S. engineers under Williamson and Wheeler, the Central Pacific railway survey under Butler and Ives, and the Californian surveys conducted by Wachenreuder, Craven, Wilson, and Loehr in 1862-72. It shows railways, roads, and country boundaries. The hills are printed in brown, and a solid tint is spread over the whole surface of the map. The intention of producing a physical map is evident, but equally evident is the total failure in this respect (due, to some extent, no doubt, to the lithographer and printer). No country in the world offers a better opportunity for an effectual rendering of the features of the ground than California, as will readily be granted on inspecting Petermann's map. Yet here we find the mighty barrier of the Sierra Nevada scarcely more prominent than the comparatively insignificant ridges scattered broadcast over the inland basin, and the great longitudinal valley, which forms so striking a feature of the Pacific state, is scarcely brought out with sufficient distinctness. Yet, a skilful draughtsman, making use of this map for purposes of compilation, could easily repair this defect (for there are numerous altitudes to guide him), and the map in other respects contains so much that is new and interesting, as to possess a value altogether independent of the delineation of the ground. Very far superior in the latter respect are the two maps resulting from F. V. Hayden's United States geological survey of the territories, which may be described as very favourable specimens of the art of engraving as practised in the United States.* These maps embrace a large portion of the territory lying between lat. 43° and 46° N., and long. 110° and 112° west from Greenwich. The Yellowstone National Park, with its wondrous collection of geysers, hot springs, extinct volcanoes, and fearful cañons, forms their central point of interest, and our notions respecting the geography of this part of the United States are altogether revolutionised by them. Yellowstone Lake, 7788 feet above the sea, still constitutes the principal feature of this, the most magnificent "National Park" of the world; but Madison Lake to the west of it, which forms so marked a feature on the map published a couple of years ago, has shrunk into comparative insignificance, whilst Shoshone Lake, 7870 feet above the sea, occupies the south-western corner of the Park. The Lewis fork of the Snake River flows from this lake, traverses lower down Jackson Lake (6806 feet), and finally passes through a succession of fearful cañons to the prairie-lands of Idaho. To the west of the Snake River rises the imposing mountain range of the Tetons, with Mount Hayden, 13,833 feet, as their culminating point. The hills on one of these maps are printed brown, on the other they are indicated by contours at intervals of 100 feet. In both cases they are rendered most effectively.

New Maps.

KIEPERT (H.) Physikalische Wandkarten (Physical Wall Maps, Nos. 1 and 2, Eastern and Western Hemispheres) 10 sheets each. Berlin, 1873. 10s. each.

LIEBENOW (W.) Special Map of Central Europe. Sections

* A. Petermann: Map of the United States. Scale 1:3,700,000. 6 sheets. Gotha, 1874. 8s. (Originally published in the new edition of Stieler's Hand Atlas.)

† State Geological Survey of California: J. D. Whitney, State Geologist:— Map of California and Nevada, drawn by F. von Leicht and A. Craven. Scale, 1:1,140,480. 1873. Washington. 2 sheets.

* United States Geological Survey of the Territories, F. V. Hayden in charge. Map of the sources of Snake River, with its tributaries, together with portions of the head-waters of the Madison and Yellowstone, from surveys of the Snake River Expedition, by G. R. Bechler, chief topographer, and J. Stevenson, director. Scale, 1:316,800. Washington, 1874.

United States Geological Survey of the Territories, F. V. Hayden in charge. Montana and Wyoming territories, embracing most of the country drained by the Madison, Gallatin, and Upper Yellowstone rivers. Geology by F. V. Hayden, assisted by A. C. Reale. Drawn by H. Gannett from notes and sketches by A. Burck, chief topographer of the Yellowstone Division. Scale, 1:316,800. Washington, 1874.

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90, 91, 103-105, 116-119, 130-133. Scale 1:300,000. Hanover, 1874. 1s. each.

MESSTISCHBLAETTER vom Preussischen Staate (Plane table sections of Prussia, surveyed by officers of the General Staff; published by the Board of Trade). Scale 1:25,000. Sheets 203. 254, 306, 320, 334, 348, 349a, 349b, 359 to 366, 376 to 383, 393 to 397, 398a and 398b, 409 to 413, 425, 426, 429 to 434, 438 to 444, 448 to 453. Berlin, 1873. 1s. a sheet.

GENERAL-STABS Karte von Preussen. 1:25,000. Amt Ritzebüttel. 6 sheets. Berlin, 1874. 1s. each sheet.

BERENDT. Geological Map of the Province of Prussia. 1:100,000. Sheet 9 (Lithuania). Berlin, 1874. 3s.

SEEKARTEN der deutschen Nordseeküste (charts of the German coasts of the North Sea, published by the German Admiralty). Berlin, 1874.

Sheet 1.—German Bight, from surveys of Captain Grapow and Lieutenant Hoffmann, 1867-69. Scale 1:300,000. 4 sheets. 6s.

Sheets 5 and 6.—West Coast of Schleswig-Holstein by Captain Grapow. 1:100,000. 4s. each sheet.

Sheet 7.—Mouths of the Jade, Weser, and Elbe, by Captain Grapow, 1867-8. Scale 1:100,000. 4s.

CARTE DE LA FRANCE dressée au dépôt des fortifications. Scale 1:500,000. Sheet 4 (Index map), sheet 5. Paris, 1874.

ZIEGLER (J. M.) Map of the Upper Engadin. 4 sheets. Zürich, 1874. 17s. in sheets, 21s. 6d. in case, mounted.

KELLER (Dr. F.) Archæological map of Eastern Switzerland. 2nd edition. Zürich, 1874, with descriptive letter-press. 6s. 6d.

HAMMER (A. M.) Carta postale dell Italia. Nürnberg, 1874. 10d.

Waaterstaatskaart van Nederland (Hydrographical map of the Netherlands). Scale 1:50,000. Prepared by order of the Home Office under the direction of P. Caland and J. A. Besier. Harlingen 1 to 3, and Ameland, 4 sheets. The Hague, 1873. 2s. 6d. a sheet.

KAART VAN SUMATRA. A Map of Sumatra, based upon C. F. Baron von Derfelden van Hinderstein's General Map of the Dutch East Indies and the more recent authorities, and published, by the King's command, under the superintendence of Lieutenant G. A. Tindal of the Dutch Navy. Scale 1:2,000,000. The Hague, 1873. 1s. 8d.

PIERRE (Director of the Botanical Gardens at Saigun). Exploration des provinces occidentales du royaume de Kmer, 1870. Paris, 1873.

ERHARD and P. LEVY. Mapa de la Republica de Nicaragua, y parte de los Honduras y Costa Rica. Paris, 1873.

WEBER (K.) Map of the Province of Chi-li (China). Scale 1:1,022,000. St. Petersburg, 1872. (In Russian.)

FRIEDRICHSEN (L.) Karte der Palau Inseln (Chart of the Palau or Pelew Islands (Carolinas) 1:300,000. Hamburg, 1874. 2s.

WERNER (Capt.) Karte des Hafens von Sabanilla (Chart of Sabanilla Harbour, from a survey made in 1873). 1:50,000. Berlin, 1874. 9d.

ANTARCTIC EXPLORATION.

M. LUDOVIC MARTINET has submitted an interesting memorandum to the Paris Geographical Society on the subject of Antarctic exploration. In opposition to the general opinion regarding the greater cold of the Southern Pole, he advances a theory, founded on some experiments of Professor Tyndall's, in favour of the probability of a warmer temperature prevailing in those regions. The chief reason why so little of the Antarctic circle has been explored, lies in its remoteness from inhabited countries. There are, however, three oceanic currents which appear to offer natural routes for the investigation of this southern "Unknown Region" (a region, by-the-bye, exceeding Europe in area). These are, firstly, a southern branch of the Gulf Stream, which washes the eastern coast of South America, and which appears to merge in the Southern Ocean in the latitude of the Falkland Isles; secondly, the current which flows through the Mozambique Channel, southward towards Enderby Land. The great Sargasso Sea, it may be observed, in the vicinity of Marion and Kerguelen Isles proves the existence of two opposing currents in this part of the ocean; and, thirdly, the great warm stream which flows past the western shore of the Panama Isthmus, crosses the equator, washes the Marquesas, and Society and Easter Islands, and finally loses itself in the Antarctic circle between 140° and 170° W. long.

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The Arctic Expedition.—The sudden dissolution of Parliament unfortunately had the effect of delaying any decision on the subject of an Arctic Expedition. When the late Ministry resigned, no definite reply had been received by the President of the Geographical Society to the letter in which he urged the consideration of this national subject on the attention of Mr. Gladstone. But it is known that the arguments submitted to Mr. Goschen had made a favourable impression upon that right honourable gentleman; while the press is as nearly as possible unanimous on the subject. The *Daily News*, *Daily Telegraph*, *Standard*, *Morning Post*, *Globe*, *Pall Mall Gazette*, *Observer*, *Saturday Review*, *Spectator*, *Illustrated London News*, *Broad Arrow*, *United Service Gazette*, *Nature*, *Athenæum*, *Academy*, *Contemporary Review*, and *Cornhill Magazine*, have all pronounced emphatically in favour of this country resuming her glorious position, as of old, in the van of Arctic discovery. The Arctic Deputation, thus strongly supported by public opinion, will now bring the subject of an Expedition before Her Majesty's Government with well-grounded hope of a favourable result. Mr. Disraeli, it will be remembered by those who were labouring in this cause, in the days of the Franklin search expeditions, was always a warm and generous supporter of Arctic work.

The Extreme North reached by the 'Polaris.'—The American Geographical Society had a reception of the crew of the 'Polaris,' at the great hall of the Cooper Institute in New York, on the 16th of last February. The most important question that was raised was as to the state of the ice up Robeson Strait, at the furthest point reached by the 'Polaris' in 82° 16′ N. After the reading of a paper by Dr. Hayes, Captain Buddington, the master of the 'Polaris,' stated that that exploring ship was met by such heavy pack-ice, that further progress was an impossibility, and that no open water could be seen beyond Newman Bay. Captain Tyson, the second master of the 'Polaris,' affirmed, on the other hand, that heavy dark water clouds could be distinctly seen to the northward, that open sea appeared to be not over 8 miles distant; and that, if the occasion had been taken advantage of, as it ought to have been, this open water could have been reached. Captain Chester, the first mate, declined to address the meeting. But he informed Captain Markham, when on board the 'Arctic' last summer, that the 'Polaris' was only stopped by a very insignificant stream of ice. through which a vessel like the 'Arctic' could easily have forced a passage, with a water sky beyond. Dr. Bessels, the chief of the scientific staff, Mr. Schumann, the engineer, and the two able seaman, Hermann Siemens and Henry——entirely corroborated this statement in frequent conversations with Captain Markham.

Return of the Channel Squadron.—In consequence of the sudden and unexpected dissolution of Parliament this magnificent fleet of ironclads returned to England a month earlier than was anticipated.

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On the 11th of March, after having performed their full-speed trial across the Bay of Biscay, on which occasion a speed of 11 knots was attained by the whole squadron, the ships separated off Ushant; the 'Agincourt,' 'Northumberland,' 'Resistance,' and 'Triumph' proceeding to Plymouth; the remainder, consisting of the 'Hercules' and 'Sultan,' going on to Portsmouth. During the last five months these vessels have been employed cruising along the west coast of Spain and Portugal, and visiting the island of Madeira. Rear-Admiral G. Phipps Hornby is still in command of the squadron, and the masterly and seamanlike manner in which the huge and apparently unwieldy ironclads are handled by him, excites the admiration of all that serve under his command. As an instance, it may be mentioned that on the occasion of the late visit of the fleet to Lisbon, the squadron in close order was led over the bar, on which a heavy sea was breaking, and up the Tagus, and anchored in the exact positions assigned to them, although a heavy S.E. gale was blowing at the time, entirely precluding all communication with the shore.

The various ships composing the squadron are under orders to be docked and refitted, and to be ready for sea by the 1st of May, so as to be prepared to take part in the rumoured forthcoming Naval Reviews in honour of the visit of the Emperor of Russia to our shores. The discipline, good order, cleanliness, and efficiency of the Channel Squadron is such as will be sure to reflect credit upon the Rear-Admiral at present commanding, who is universally and deservedly popular.

The statement in the *Western Morning News*, which has been copied into several London papers, respecting desertions from the ships of the Channel Squadron, is entirely devoid of truth in every particular. There were no desertions from H.M.S. 'Sultan' during the stay of the fleet at Lisbon, or indeed during the whole of the recent cruise.

The Bengal Famine.—At page 513 of the March number of *Ocean Highways* reference was made to the reasons for not prohibiting the export of grain, which are given in the minute by the Governor-General. Lord Salisbury, in his speech in the House of Lords, has further explained the considerations which have led the Government to refrain from interfering with private trade. The exported grain has not been exported from the suffering districts. In some parts of Bengal there is a large surplus crop; and the prohibition to export grain would have paralyzed the operations of private trade. The supply for present purposes is abundant, and (owing to the operations of private trade not having been interfered with) the traders have never been alarmed, and are now in the natural course of things conveying their stores of grain to the famine districts at the rate of 2000 tons a day. An opposite policy would have deranged and paralyzed the operations of traders, would thus have thrown the whole burden of relief arrangements on the Government, and would have led to most disastrous consequences. Lord Northbrook's admirable firmness has averted this danger. The great and only difficulty is, therefore, not to procure grain, but to transport the supplies to the homes of the suffering population. Every nerve is now being strained to secure this all-important object. Since November the railway has carried into Bahar 355,000 tons of food on private and Government accounts; and the Viceroy had ordered 80,000 tons more from Burma.

The Winter in Persia.—The winter of 1871-72 in Persia, immediately following the famine, was considered the coldest on record. But that of 1873-74 has surpassed it, both as regards fall of snow and lowness of temperature. Heavy floods have destroyed nearly a third of the city of Shiraz, and other towns have suffered more or less severely. In about the middle of March, by which time winter has usually entirely ceased, there was a fall of nearly 18 inches of snow over nearly the whole country. The rainfall at Bushire, this year, has reached the unparalleled height of 12 inches — the usual annual rainfall seldom exceeding 2 inches. Heavy snowfalls have also been reported at Constantinople; and it would seem that the winter has been as remarkable for its severity in Western Asia, as for its mildness in England.

"Telegraph and Travel."—Sir Frederic Goldsmid's work, under this title, will appear in the course of the spring. The construction of the electric telegraph in Persia has had a sensible effect on the progress of civilization in that country; and a narrative of the operations of the officers who executed this important work will be most interesting. Sir Frederic also relates incidents of travel while traversing routes in Persia, and the countries on her western frontier, which are but imperfectly known to the general reader. His opening chapter contains a memoir of the late Colonel Patrick Stewart, who died from the effects of exposure and overwork at Constantinople, before the success of his labours could be made manifest. Sir Frederic Goldsmid took up and completed his work.

Mr. Ashton Dilke on Central Asia. — The return of Mr. Dilke from Russia enables us to look forward to an interesting evening meeting to be devoted to the subject of Central Asian geography at the Geographical Society, on the 13th of April. After briefly describing the routes he took, Mr. Dilke will give an account of the province of Kuldja, which no other Englishman has visited; and will discuss some points of the highest geographical importance, bearing on the hydrography of Central Asia.

Affairs in Kokan. — During last summer a serious revolt broke out in Kokan. The Khirgiz and Kipchaks rose against the Khan, took possession of the town, and looted the treasure-house. In the mountain ranges to the south and south-west of the town this revolt is still in full vigour, and the Khan's executioner, on the other hand, is busy at work. At one time a fair prospect of a peaceful settlement appeared, for the Khan despatched an ambassador to offer terms, and forty delegates of the Kipchak tribes returned with the messenger to make their humble submission. The Khan, with the characteristic treachery and violence of these petty eastern potentates, caused all forty of the delegates to be beheaded. This has prolonged the struggle, and unless quiet is soon restored, it is said that Russia will take strong measures to ensure peace throughout the Khanate.

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Murder of the "Mirza."—We regret to hear of the reported death of this energetic native explorer, attached to the Great Trigonometrical Survey of India, who is so well known for his exploration of the southern source of the Upper Oxus, and for his journey across the Pamir Steppe to Kashgar. He and his son-in-law had been travelling through Afghanistan, but for some time no letter had been received, and at last a report reached India that, while traversing the road from Herat to Maimana, he and his assistant were murdered, while asleep, by their guides. Endeavours are being made to get fuller information, and to recover the Mirza's papers.

Lieutenant Cameron's Journey to Unyanyembe.—The letters and sketch-map sent home by Lieutenant Cameron afford the means of judging of his efficiency as a traveller. Exclusive of the detention for thirty days at Rehenneko, caused by circumstances over which he had no control, he was 107 days marching from the coast to Unyanyembe in the worst season of the year. Captains Burton and Speke, in 1857, were 134 days, and Captains Speke and Grant, in 1860-61, were 114 days. The daily rate of all, including stoppages, was about 4 miles. Captain Speke took twenty-eight observations for latitude and seven for longitude. Cameron, going over old ground and simply verifying, took nineteen for latitude and four for longitude. His observations agree well with those of Speke. So excellent a beginning gives promise, if illness does not overmaster the gallant young explorer, of good work to the end.

Discoveries of Guano on the Peruvian Coast.—The Commission appointed by the Peruvian Government to survey the deposits of guano south of Iquique has submitted its report. In Pabellon de Pica over 6,000,000 tons of pure guano were found, containing a large proportion of ammonia. On the Punta de Lobos there are 2,000,000 tons, and in Chanabeya 150,000 tons, all of excellent quality. The surveying party executed plans, profiles, and measurements of each deposit. A second commission has been appointed to carry out a more complete and exhaustive investigation.

Surveys in Bolivia. — The wise measures of the Bolivian Government, with reference to the employment of engineers to execute surveys, will lead to a large increase in our geographical knowledge of this interesting part of South America. Mr. Reader Harris, at present in this country, is now Engineer-in-Chief to the Government of the Republic of Bolivia; and a staff of engineers is employed under him. The system, when a speculator applies for a concession to construct a railway, work a mine, or for any other purpose, is to cause a survey to be made by the Government engineers, for which the applicant pays. Thus much valuable work will gradually be done, not only by the engineers in the execution of their duties, but also through the mere presence of educated and intelligent Englishmen in the country. Mr. Reader Harris has already caused a careful survey to be made of lake Tiquina, the southern portion of lake Titicaca; and the map is very shortly expected to arrive in England.

Correspondence.

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THE PORTUGUESE COLONIES IN AFRICA.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In continuation of my letter in *Ocean Highways* for December, 1872, p. 286, I now have the honour to forward some further notes on the Portuguese Colonies, their productions, usages, and customs, especially with reference to the Zambese, Zumbo, Tete, and Senna. The Zambese is one of the most notable rivers of Eastern Africa. It crosses the Monomotapa, washes Zumbo, the plains of Chicova and Tette, divides the mountains of Lupata, passes close to Senna, and discharges itself into the Mozambique Channel through seven branches, the most northern one being the Cuama, which enters the sea near Quelimane. Its width varies, according to the parts it traverses. In Lupata, although extremely deep, it is only from 200 to 300 yards broad. Below Zumbo there is a spot where those who navigate the river are obliged to unload their canoes, and drag them over the rocks, because of the violence of the current there. Like the Nile, it fertilizes the fields by its inundations. These take place from November to July. After this season the river subsides considerably, but even then, according to the evidence of Dr. Livingstone, it is never low enough to be fordable.

It is during the time of the floods that the climates of Senna and Quelimane become exceedingly unhealthy, in consequence of the drift matter that floats down with the current of the river. The Zambese has auriferous sands. Livingstone observed some in which gold could be seen in minute particles, differing from the gold of Mashinga which is larger, and also from that of Abutua and Manica, which is found in pieces the size of grains of wheat. There are also coal mines on its banks. Chicova, once so celebrated for its silver mines, still abounds with this metal. The iron ore is of so excellent a quality that after smelting it resembles the best Swedish iron, both in colour and hardness.

According to Dr. Kirk, the year on the banks of the Zambese may be divided into three parts: the cold season, the warm, and the rainy season. Three months of winter, May, June, and July; three months of summer, August, September, and October; and the remainder of the year the wet season. Ordinarily the water of the Zambese is absolutely pure. The negroes who inhabit the banks of the Zambese are in general strong and robust. They apply themselves to agriculture, having given up the breeding of cattle in consequence of the tsetsé fly, the veritable curse of those regions. My friend Fernando da Costa Leal, when he accompanied the celebrated German traveller Karl Mauch, in an excursion from the Transvaal to Lourenço Marques, had opportunities of observing that insect. According to him the bite of the tsetsé fly is only fatal to certain species of animals, producing in man nothing but a slight inflammation which disappears on bathing the affected part in cold water. Ammonia is a powerful neutraliser of poison inoculated by the sting or bite, not only of insects, but even of poisonous reptiles. It appears, however, to have but little effect on the poison of the tsetsé fly. Karl Mauch administered ammonia to an ox stung by that insect, but without favourable results.

Agriculture is carried on among these people in primitive simplicity, but notwithstanding this, the negroes succeed in obtaining abundant crops, owing to the remarkable fertility of the soil. Their mode of sowing is as follows: as soon as the floods of the river recede, and the land appears, they make shallow holes, into which they drop a few grains of wheat, and afterwards cover them with the soil. Besides wheat, they sow the greater millet—which grows there and is as good as that

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of the Cape—the smaller millet, haricot beans, gourds, and rice.

The chief of Cazembe is styled emperor, and is subject to Malianvo. The latter, although he enjoys a great reputation among the people he governs, has but very limited power. He receives some presents from the chiefs who, when expedient and in fear of other chiefs, invoke him as a hobgoblin.

The empire of Monomotapa—that is, of the Lord of Matapa, the words mona, moata, moene, morin, all being derived from the Hebrew word "moraina," signifying Lord—is composed of small settlements with a species of mayor for each one, whose duty it is to collect a tribute of rice, wheat, &c. The country is called Chidima, and is not very extensive. When Dr. Livingstone visited it, the chief had a hundred wives. The government is a description of feudal republic. Slavery is hereditary, but there is a middle class of free men. The nephew, a son of the chief's sister, succeeds on the death of the chief, and never the son of the latter. They explain this custom by saying that there must necessarily be a degree of consanguinity between the chiefs and his sister's sons, whereas there might not be any as regards his own sons.

Zumbo is a village now partly in ruins, though once in a flourishing state, through its commerce. It is situated about 60 leagues above Tete. It was founded by a native of Goa named Pereira, who, at the head of a body of men, came and established himself there. Six leagues distant from Zumbo are the celebrated mines of Parda Pemba, from whence much gold was formerly obtained. They are now abandoned, showing that there is at the present time but little gold in them.

Tete is situated on a slope descending to the Zambese. The houses are built on the crest of the rock. The fort on the bank of the river is dominated by the hill. To the south of the town there is a very deep valley, beyond which rises an oblong mountain named "Caroeira." There is abundance of calumba in the neighbourhood of Tete, which is used for dyeing purposes, and is better known by the name of colombo. It is the root of a plant called by Lamarck *Menispermum palmatum*, and in trade is met with in the shape of small discs of an inch and a half in diameter, or in pieces of two to three inches, covered with a thick kind of yellow bark, easily detached with the finger, under which is seen a wrinkled skin of either a brown or olive colour. The taste is bitter, and the smell unpleasant. Planche says it contains starch, gum, an element of bitter yellow material, volatile oil, salts of lime and potass, oxide of iron, silica, and a fibrous matter similar to flax. It acts on the body as one of the best tonics, but if used in large doses the colombo-root produces nausea and vomiting. Properly taken, it strengthens the organs and efficaciously destroys the atonic diseases of the stomach and intestinal canal. Drapier and Guibourt say that this substance has become very scarce in trade, it being fraudulently substituted by a similar article which comes from Algiers and the northern coasts of Africa. The latter differs from the true colombo, having a sweet acid flavour, very little smell, and does not turn blue when brought into contact with iodine, as it contains no starch. Colombo-root has lost somewhat of the fame of its virtues because of its being so falsified.

Near Senna, the Zambese contains numerous islands covered with reeds or canes. The soil is extremely fertile, but the stagnant waters render the locality insalubrious. About 400 paces from Senna, on the western side, is the mountain "Baramuana," from which a most enchanting landscape is seen. Some 20 or 30 miles distant the "Morumbala," a mountain of volcanic origin, whose highest parts are cultivated by the inhabitants, is discovered. On this mountain there is a spring of warm and sulphurous water. The mountains of the Maganjas stretch away towards the north, and approach the river in the neighbourhood of Senna.

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Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

March 9th, 1874.

RAILWAYS IN PERU.

THE PRESIDENT took the chair at 8.30 p.m. Among those present were His Excellency Don Pedro Galvez, the Peruvian Minister, Dr. Gonzalez de la Rosa, Mr. H. H. Gibbs, Lord George Hamilton, Lord Cottesloe, Sir Harry Verney, Mr. Keith, Mr. Hutchinson, and Colonel Church.

The first paper was entitled "Across the Andes from Callao," by Thomas J. Hutchinson, Esq., H.M. Consul at Callao.

The most masterly sketch which I have read, of the programme to be adopted by Peru in her great system of railways—initiated more than fifteen years ago—is contained in a pamphlet written by the existing President of the Republic, when he explored the province of Jauja in 1861.* In it he speaks of the three great lines to cross the Andes:—first, the track suggested from Chala, which was afterwards changed to Mollendo, to go through Arequipa, and Puno to Cuzco; second, the one now in progress from Pacasmayo by Magdalena to Cajamarca; and the third, to Junin, which was to include the provinces of Jauja, Tarma, Huanuco, and Huancayo, together with the district of the silver mines of Cerro de Pasco. It is to the last mentioned, which comprises the stupendous works already done, on the road from Calloa to the Oroya station that this paper chiefly refers.

In the *brochure* just alluded to the author expatiates on the riches of the Junin department, as being more worthy to excite the attention of the Peruvian Government, as well as of capitalists and speculators, than any other part of the Republic. He enumerates the peculiarities of each of the provinces contained therein—describing their geographical relations with one another, as with the rich valley of Chanchamayo, and more especially with the province of Jauja, which was the particular object of his study. The valley of Jauja he describes as a garden, exceeding 40 square leagues, or above 360 miles in extent, variegated by picturesque residences, surrounded by trees, and its magnificent river set off by the charming vegetation on the hills that skirt its course. The mineral riches of the silver mines of Cerro de Pasco; of the quicksilver at Huancavelica; of the copper at Tuctu-Cocha, as at Moro-Cocha, are likewise described. In the last-named place coal has been found, of which Don Manuel writes as equal to that of Newcastle. The distance, as the condor (not the crow) flies, from Lima to Jauja, is above 20 leagues, or a little over 60 miles; but the road which mules had to travel was beyond 50 leagues, or more than 150 miles. The valley of Jauja is 17 leagues beyond the highest peak of the Andes to be crossed in the transit to it. We can therefore scarcely wonder that the freight of goods on this journey, at the time indicated, was charged 80 dollars per ton, or "from Lima to Jauja, four times more than it would cost from Callao to Liverpool or China." † Then he goes on to prove what beneficial results must ensue from the introduction of a railway into these regions, and with those points discusses the peopling of the Amazon Valley. The two grand ideas, entertained by Señor Pardo, in reference to the three lines of railways to which I have

* Estudios sobre la Provincia de Jauja, por Don Manuel Pardo. Lima, Imprenta de la Epoca, 1862.

† Op. cit. p. 23.

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alluded were, that, in conjunction with the development of the mineral wealth of Peru, they should introduce colonization into those parts of the Amazon valleys which belonged to his country, as on the sea coast they might be joined together by a line running parallel with the Pacific Ocean. This last-named idea was originally suggested by Mr. William Wheelwright, whom Señor Pardo appropriately designates "the Hulton of South America." But this has been better supplemented by another and more practicable institution, originated and founded by the same Mr. Wheelwright, namely, the excellent service of the Pacific Steam Navigation Company. It effects an almost daily communication and intercourse along the whole shore of the Southern Pacific, from the Straits of Magellan to the Isthmus of Panama. And although commencing its career in 1840 with only two steamers, the 'Chile' and the 'Peru,' it has now sixty vessels—one of the finest fleets of merchant squadrons in the world.

So far back as 1856,* however, Señor Malinowski had been commissioned by the Government to give a report on the works of public utility in Peru; more particularly on the roads of communication along the coasts and to the interior.

In his report on the Central Transandine Railway Line, Señor Malinowski observes:—"On a simple inspection of the map we can notice the importance of the position, called Oroya, to satisfy all the exigencies of a general head-quarters position at the other side of the Cordillera. From thence branches can be made in three principal directions; and evidently the most direct way from Lima to Oroya, that by the valley of the Rimae, is the preferable one."

The Oroya line, as well as the two others alluded to in the first part of this paper, are all in the hands of Mr. Henry Meiggs, a citizen of the United States, who may be entitled "the Railway King of Peru." The contract for the Oroya line was given to him on the 18th of December, 1869, with the conditions that the road should be completed, and its equipments finished, in six years from the date of signing, the price to be 27,600,000 soles (about five millions of pounds sterling), in Peruvian bonds—the work to be done in pursuance of the details and specifications laid down by the Government engineers.

Mr. Hutchinson then described some of the extraordinary engineering works by which the railway is carried over the Andes, and his paper was illustrated by diagrams. The line goes from Lima to Coca-Chacra, up the valley of the Rimae, and thence to the Chosica bridge, 26 miles from the capital. The bridge is 262 feet high, and the line approaches it by a tunnel in the solid rock, and leaves it by another. Thence to Surco is a distance of 4 miles. From Surco to Matucana the line accomplishes an ascent of 1100 feet in 12 miles. Matucana is 7788 feet above the sea. From Matucana the line runs on through tunnels and over bridges, gaining height by zigzags. From Matucana to San Mateo a height of nearly 3000 feet is gained in 15 miles. The latter place is 10,530 feet above the sea. A little further on the river passes between two perpendicular walls of rock 1500 feet in height. A tunnel is here cut through the mountains, and the line is taken across the chasm by a bridge of 160 feet span, and 165 above the water, to enter another tunnel in the perpendicular rock on the opposite side.

The scene in this passage must be something indescribable, with the sensation of that momentary glimpse of sky whilst crossing in mid-air out of one gloomy cavern into another, with the bare glimpse of nearly a thousand feet high of Cordillera wall towering above the train. The line between Casapalca and Rio de Visca, crosses the summit in a tunnel 15,650 feet above the sea, and 104½ miles from Lima. The tunnel is three-quarters of a mile long, and the highest portion of the mountain above it is 680 feet. Thence the distance to Oroya is 30 miles.

That the government of Señor Don Manuel Pardo does not mean to allow this railway to be limited to Oroya is evident from the fact of a law passed by Congress on the 30th of April last (1873), in which, amongst other lines, it is authorised to construct a railway from Oroya to Pasco (already mentioned as the great silver district), with a line from Oroya to Jauja and Huancayo. That it will eventually be extended through the valleys of Chanchamayo, Moyobamba, Loreto, and the many rich stretches of land that constitute the small world contained in the Amazon district, I have not the slightest doubt. The latest summary which I have read of what has been done, and is doing, amongst the tributaries of the Father of Waters, is an excellent and clearly written article in *Ocean Highways* (number for October, 1873, p. 265), by Lieutenant Don Juan Salaverry, of the Peruvian Navy.

The other line to Caxamarca is in rapid progress. In a couple of years more we may expect to hear of the Peruvian President going on a trip from Lima on the Oroya Railway, and passing through the tunnel beneath the lofty summit of the Chuquichuco, stretch out the right hand of fellowship, not only to all the nations of the Amazon Valley, but to those at the other side of the wide Atlantic, into which the mighty waters of the great river are discharged. The civilised world will then give its meed of tribute to the intelligence and wisdom of the Peruvian Government, and to the indomitable energy of her great railway contractor, Mr. Henry Meiggs.

The second paper was entitled "Railroad and Steam communication in Southern Peru," by Clements R. Markham, C.B., F.R.S., Secretary. While the railway described by Mr. Hutchinson will connect the capital of Peru with the valleys of Tarma and the mines of Cerro Pasco, the great work which has just been completed in the south of Peru, will bring the mineral wealth of Bolivia, and the rich products of the eastern valleys into direct communication with the Pacific ports.

The central region of the Peruvian Andes presents an aspect very different from that to the south and on the Bolivian frontier. In the centre the space between the Maritime and Eastern Cordillera is comparatively narrow: it is broken up into deep, worn valleys and profound ravines, where wheat, maize, and even sugar-cane, are grown in the different zones of elevation. But the southern part of the Peruvian Andes and the northern portion of Bolivia present a very different character. From the Vilcañota knot, the Andes separate into two distinct chains, namely, the Maritime Cordillera and the Eastern Andes, which include the loftiest peaks in America. The region between these two ranges contains the great lake of Titicaca, and consists of elevated plains intersected by rivers flowing into the lake, at a height never less than 12,000 feet above the sea. It is usually called the Collao, from one of the tribes which occupied it in ancient times. The surrounding mountains contain inexhaustible stores of copper and silver, the plains afford pasture for large flocks of alpacas, while the inner slopes of the Eastern Andes produce the best Peruvian bark, coffee, cocoa, coca, arnotto, and are watered by streams containing gold dust in large quantities.

It has long been an aspiration of the best Peruvian statesmen to see all this wealth borne over lake Titicaca by steamers, and across the frozen plains of the Maritime Cordillera by some more expeditious means than is afforded by the backs of llamas and mules. Nearly thirty years ago Don Manuel Costas, the present Vice-President of Peru, made an attempt to place a small steamer on the lake. He foresaw that, if this could once be done, a most important trade would spring up, which would give fresh life to the people of this classic land. All the products of the Bolivian forests—timber, chin-

* "Documentos Legislativos sobre el Establecimiento y la Mejora de las Vias de Comunicacion en el Peru." Lima, 1856.

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chona bark, chocolate, coffee, coca, fruit and arnotto—would be conveyed to Yuao; and European manufactured goods, the maize of Cuzco, the aguardiente of the coast valleys, and the sugar of Abancay, would be sent in exchange to the Bolivian ports. There would, also, be a brisk trade in wool, silver, and copper; and a traffic in provisions of all kinds between the Indian villages near the shores of the lake. Timber in vast quantities might be felled and sawn in the forests of Caravaya, and floated down the rivers of Azangaro and Ramiz during the rainy season, which, with the coal on the island of Loto, would furnish supplies of fuel. A railroad across the Andes, connecting the steam navigation of the Titicaca Lake with the ports of the Pacific, was a stupendous undertaking which, even fifteen years ago, was scarcely dreamt of by the most enthusiastic speculator. Yet the whole of these schemes have not only been undertaken, but are now completed and actually in working order.

The railroad from the port of Mollendo to Arequipa has been completed some years. Mr. Meiggs accepted a contract to construct a railroad across the Andes, from Arequipa to Puno, for 32,000,000 soles (6,400,000*l.*), or 29,500*l.* a mile. The cost of transport, labour, materials, and provisions was, of course, enormous. The distance from Arequipa to the shores of lake Titicaca is 217 miles, and the works were commenced on June 7th, 1870.

After leaving the city of Arequipa the line crosses the river Chilé by a superb viaduct 1505 feet in length and 70 feet above the river bed; and there are three other viaducts of equal magnitude, all constructed in the United States, and conveyed to their sites with infinite difficulty. Embankments of various heights, from 50 to 500 feet, are numerous, and, in some cases, the rough and steep slopes are overcome by reverse tangents. In one place there is a cutting 84 feet deep, on the side of a precipice, with the roadway 1000 feet in perpendicular height above the valley. The longest tunnel is only 300 feet from mouth to mouth. Extraordinary difficulties had to be overcome, as may well be supposed when the inaccessible nature of the country is considered, the long distances without water, the heavy snowstorms, the absence of roads, and the intense cold of the loftier portion. From Arequipa to the baths of Yura, a distance of 17 miles, there is no water, and up to this point the costly expedient was adopted of conveying it to the works on mule-back. The same thing was necessary from Caniaguas for 26 miles. From 4000 to 5000 labourers, chiefly Chilians and Bolivians, have been constantly employed during three years and a half, and on the 1st January, 1874, the first locomotive reached the shores of lake Titicaca. The highest point on the old road from Arequipa to Puna is 15,590 feet above the sea, and that of the line selected for the railway cannot have been much less.

Meanwhile, active steps have been taken to establish steam navigation on lake Titicaca. In 1861, the Peruvian Government ordered two screw steamers in London (20 tons, 40 H.P.), called the 'Yaravi' and 'Yapura,' which were sent out to the port of Arica, thence to Tacua by rail, and finally the pieces were carried across the Andes on the backs of mules to Puno. But several pieces were lost, and the project remained in abeyance until 1868, when Captain Melgar, of the Peruvian Navy, was appointed to put together and launch the steamers. He set to work with zeal and energy. Those who have crossed the Andes, and seen the total absence of all resources at Puno, can form an idea of the difficulties that have been overcome by Don Manuel Melgar. He had to build a factory and a stone mole, and to bring up all the workmen and materials from the coast, the lake being 12,000 feet above the sea. The 'Yaravi' was launched in June, 1871, and the 'Yapura' on the 19th of March, 1872.

Their presence on these inland waters, together with the railway, will revolutionize the commerce of the surrounding provinces, knit the people of Peru and Bolivia together by common interests, and put new life into the inhabitants of the shores of Titicaca, the sacred lake of the Yncas. Markets and rapid means of communication having been secured, the trade of this region may be expected to increase rapidly on all sides. The face of the country will be entirely changed; the people, finding new wants, will become more civilized, and Puno, instead of a town with empty, silent streets and half-a-dozen reed *balsas* at its anchorage, will soon be a flourishing and busy port. When I was there, now nearly fourteen years ago, these prospects seemed far distant; but now, thanks to the energy of the Peruvian Government, and of the great contractor, Mr. Meiggs, they seem to be close at hand.

The cause of geography will be wonderfully advanced by these undertakings. At present there is no complete survey of the basin of lake Titicaca, which, in some important respects, possesses geographical interest. Lake Titicaca covers a superficial area of about 2500 square miles, being 100 miles long by 35 wide, and the surface is 12,196 feet above the sea. It is divided into two parts by the peninsula of Copacabana, the south division being 8 leagues long by 7, and united to the larger portion by the strait of Tiquina. A number of rivers, which are swollen and of considerable volume during the rainy season, flow into the lake; and the water is carried off by the drain or *Desaguadero*, which, after a course of 160 miles, empties into the salt lake and swamps of Paria or Aullagas.

The Desaguadero, connecting lake Titicaca with the Aullagas, is a very remarkable feature. At this great elevation land vegetation is stunted and scanty, but in the waters of the lake there are acres of tall rushes. The constant east winds blow all the dead rushes to the western side, where they mix with the living beds and form a dense tangled mass. Out of them flows the drain, with the surplus waters of the lake, and so, by a channel 160 miles long, connects Titicaca with the salt swamps of Aullagas. Davalos y Figueroa, a native of the country, who wrote in 1601, even speaks of the whole as one lake, saying that in one part, where it is called the Desaguadero, or drain, it becomes very narrow.

These features cannot fail to remind the meeting of the interesting discussion, in which Sir Samuel Baker took part on January 26th, on the subject of the supposed connection between the African lakes, Tanganyika and Albert Nyanza. The surface waters of Titicaca, like those of Tanganyika, are fresh; and, in Sir Samuel Baker's view, Tanganyika is connected with the Albert Nyanza, which is at the same level, by a channel analogous to the Desaguadero, flowing from Titicaca to the Aullagas swamp.

The Aullagas, which is the final receptacle of all the drainage of the Titicaca basin, is of course utterly unlike the Albert Nyanza, because it has no outlet, and is surrounded by Cordilleras of the Andes. It is salt, but it has always been doubted whether the large volume of surplus water flowing along the the Desaguadero can be disposed of by evaporation alone. Cieza de Leon, an accurate and trustworthy old soldier, who was in Peru shortly after the conquest, and wrote in 1553, mentions a report that, in some of the coast valleys of Tarapaca, there were streams, which were believed to be the waters of lake Aullagas, opening for themselves a way through the bowels of the earth. In his recent exhaustive report on the Tamarugal plains, in the Tarapaca province, Don Miguel Valle Riestra suggests a similar explanation, namely, that the waters of Titicaca, after draining into the Aullagas Lake, find their way by filtration to the lower level of the Tamarugal.

I have referred to these points in order to indicate how much there is of real geographical importance and interest which still awaits investigation in the region now at last brought within easy reach of the sea coast by a railroad. A thorough survey of the great lake of

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Titicaca, and of its whole drainage area, is still a desideratum. Pentland went round the lake and fixed numerous positions, many years ago, but his was only a route survey; and d'Orbigny mapped the southern shores of the lake. When I first crossed this region, my duty obliged me to follow very much in the track of Pentland; and my latitudes and hypsometrical observations agreed satisfactorily with his, my heights being a few hundred feet less. But in returning, as soon as I went off Pentland's track, I came upon new features. Among these is the lake of Arapa, north of Titicaca, which is not on Pentland's map, though it is mentioned by Castelnau. Captain Melgar, the introducer of steam navigation on lake Titicaca, has made a survey of the coast from Puno to Jeli, and also confirms the accuracy of Pentland's observations for latitude. He has carefully examined the islands on the lake, especially that of Titicaca, the beautiful sacred island of the later Yncas, where artificial terraces, full of flowers, rise from the water's edge, tier above tier, to the hill tops, irrigated by channels drawn from the royal bath. All these classic spots around the sacred lake will now be explored and correctly mapped; and we shall at last get an accurate knowledge of this, the most interesting region, next to the Cuzco Valley, in all South America.

The valleys and wide forest-covered plains to the east of the Andes, in Caravaya and Bolivia, will also be explored. Beyond the work done by Don Antonio Raimondi and by myself, the vast and rich province of Caravaya is, so far as accurate geographical data are concerned, unmapped and unknown. Its wealth is enormous and inexhaustible; its rivers diverge to the point in the vast South American wilderness where Colonel Church is so ably and resolutely working to complete a railroad round the rapids of Madeira. Its more complete exploration will be a memorable geographical feat.

Now that the Peruvian Government has provided the means of rapid communication from the coast to the interior, its enlightened President, Don Manuel Pardo, has resolved to invite European explorers to judge for themselves of the resources of the ancient empire of the Yncas. An important decree was issued at Lima on January 13th, 1874, enumerating the lines of railway that are now actually open, as well as those in progress.

1. From the port of Ylo to Moquegua.
2. From the port of Mollendo, by Arequipa, to Puno.
3. From Pisco to Yca.
4. From Callao to San Mateo (on the way to Oroya).
5. From Chimbote to Taquilpon.
6. From Pacasmayo to La Viña (on the way to Caxamarca).

The decree announces that, as the districts traversed by these railways abound in mineral wealth, it is desirable to bring to the notice of European enterprise the character and extent of the riches to be found within the territory of Peru, and the means of communication which place these riches within the reach of private enterprise. With this object, lithographed plans of the Peruvian railroads, accompanied by sketches of the most prominent engineering works on them, and brief descriptions, are to be published in English, French, and German. Collections of samples of the principal minerals and coal found in the districts traversed by the railroads are also to be made in triplicate, by Don Antonio Raimondi, the State Geologist, and placed on exhibition in London, Paris, and Berlin.

The Fellows of this Society will heartily applaud the action thus taken by the Peruvian Government; for not only will it at once supply us with a large amount of new geographical information; but it will tend, in its results, to the mapping and exploration of regions now little known, but which yield to none in the world in interest and importance; whether we regard their physical structure, the magnificence of their scenery, the grand scale on which nature has worked within their limits, or their inexhaustible riches.

The PRESIDENT said that those who were well acquainted with the principal passes of the European Alps might form some idea of the difficulties which had been surmounted by railway engineers in Peru, in carrying the line over an altitude higher than Mont Blanc, which had just been described.

Mr. HUTCHINSON said that the most eloquent written description could scarcely convey any idea of the wonderful masses of rock through which the Peruvian railways have been made, or of the equally marvellous engineering work which had overcome the difficulties as they presented themselves.

His Excellency Señor DON PEDRO GALVEZ (Peruvian Minister) said it was to him a remarkable spectacle to observe a scientific society like this taking so much interest in the progress of a distant country. It had been at all times the noble object of science to sacrifice time and labour to studies which, although they do not produce any immediate advantages to those who undertake them, create for humanity fountains of prosperity in the future. We had the examples of persons who have devoted their lives to geographical discovery or study, and such persons he thought merited the title of benefactors of humanity. As regards Peru, the authors of the papers they had just been listening to, have devoted a considerable portion of their lives to researches in that country, the results of which were embodied in works which have obtained a well-merited reputation. Mr. Markham had treated in the most practical manner the geographical questions in connection with the actual condition of nations, and had thus obtained, not simply a distinguished place amongst the geographers of his country, but had also won in the New World the estimation and gratitude of that continent. Mr. Hutchinson also, during the intervals of his official duties, had been enabled to devote a considerable portion of his time to the study of Peruvian geography and history. He would honour, then, in these individuals, all the members of a society whose object is the study of all parts of the world, free from every feeling of selfish interest. But it was also his duty to thank this meeting in a special manner for the interest with which it had listened to everything that had been said with reference to Peru, the progress of its public works, and the administrative career of its Government. Fulfilling its duty, and responding to the aspirations of the country, the Government of Peru was employing every means to stimulate activity in all branches which could contribute to its general progress. Railways had occupied the principal attention of the Government, and they had already progressed considerably, as was shown by the fact of there being now 1056 miles of line completed; and as many more would be completed within the next two years. The great Cordillera has been crossed in different parts, and communication between the rich localities of Peru will facilitate their development, and encourage reciprocal internal and external commerce in Peru. But railways were only a means of transport, and our thoughts must necessarily turn to what products there are to be transported. The mines and the agriculture of the country are the sources destined to supply the elements of progress to commerce, as well as the advantageous development of the railways; and the Government in its operations has paid the utmost attention to each of these sources of wealth. It is well known that at the time of the discovery of Peru, its minerals pre-eminently excited the attention of its conquerors. Its gold seduced them, and devoting themselves exclusively to its search, Peru became proverbial as the country of gold, as though the other sources of wealth characteristic of its soil had been entirely overlooked. Vessels, laden with the precious metal, sailed for the mother country every two or three years, taking from ten to fifteen millions of hard dollars (from two to three millions sterling), exciting the avarice of the rest of the world. What a small amount that sum of gold was, compared with the present product of

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some of the other branches of commerce in Peru. The precious metals, which at the present time are worked as extensively as they were during the period of Spanish government, occupy the fourth or fifth place amongst the articles of export from Peru. But an immense future is now opened to these precious metals, by the introduction of railways, in reducing, very considerably, not only the cost of transport, but also of their production, and this will lead to the re-opening of many of the formerly abandoned mines, which will give the most beneficial results. Already companies are being formed here to work mines, which will return incalculable dividends to the capital invested therein, and it will not simply be the mines of precious metals which give these great results, but all kinds of minerals, stones, and above all, the coal which exists, of the very finest quality, in the interior of Peru, and which only await the reduction of the cost of carriage to the coast in order to become of the utmost importance. The Government, with the view of facilitating the formation of these companies, and the investment of those capitals for the general good, had ordered to be sent to Europe a collection of minerals, which will serve as a base for scientific persons to estimate these advantageous speculations. When these collections reach me, I shall have great pleasure in announcing their arrival to various scientific societies like this. Agriculture, which may be termed the most solid base of the prosperity of States, occupies in Peru a position second to none, as regards its quality, its variety, and the extent of its products. The immense Cordillera divides the country into three regions, each of which contributes its special products. This renders every cultivation possible in Peru, because there are all kinds of climate, and every variety of soil, but these are not sufficient to obtain an abundant production—hands are also required, and of these we are in great want. The Government of Peru had made the most laudable endeavours to attract immigration; but if the efforts have not yet been successful, we might now expect a better result, with the increased facilities of communication, and with the more extensive knowledge which one country consequently obtains of another, and with the results of past experience. For this purpose, the last Congress of Peru voted a specified sum towards promoting European emigration, and the Government has taken adequate measures to encourage that which will be most specially advantageous to the country, namely, agricultural immigration. I need hardly say, in speaking of immigration, that we consider our endeavours are best employed in obtaining that which comes from countries like England, whose flourishing colonies have become great States, and at the present moment exhibit, in their dependent provinces, the most solid principles of liberty and progress.

The commerce of Peru has progressed in proportion to the increase of its products and the facilities of transport. Speaking only of its connection with England, the importance of the commercial relations between the two countries has doubled in the last thirty years; and if Peru already occupies a distinguished position amongst the nations trading with the United Kingdom, we may well hope a few years will place her amongst the most prominent. This progress is due in a great measure to the wonderful advancement of maritime and telegraphic communications. Thirty years ago, two steamers of 800 tons made monthly voyages along the Pacific coast, whereas now there is a fleet of over seventy steamers, some of which are 3000 or 4000 tons, making daily voyages on the coast, and bringing all those ports into constant communication with each other. The communications by the Isthmus of Panama being insufficient, other lines of steamers have been established, *viâ* the Magellan Straits, which more directly connect the coast of the Pacific with the rest of the world. Telegraphs had made progress corresponding to navigation and railways. The telegraphic cable now extends from Europe to Panama, and the Peruvian Government had lent its protection and every possible facility for the laying of a cable between Panama and the coast of Peru, which is to be completed within two years, and connected with the telegraphic communication already existing in the interior of Peru. While speaking of this progress there was no motive for the existence of any individual or personal vanity, or for any government or for any one generation taking credit more than another. Each one fulfils the destiny allotted to it; and whilst we take advantage of the works of those who preceded us, and of the assistance, the instruction, and the resources of other countries, we should commence by acknowledging the benefits received, appreciate them at their full value, and solicit their continuance. The interest which had been shown by this Society in all that had been said about the state of Peru, appeared to him to show how great a part of her advancement was due to England; and whilst making this sincere acknowledgment, he trusted that the members of the Geographical Society, who contribute so largely to the pacific relations of all the world, would receive this expression of his country's gratitude.

Mr. KEITH said the wealth of Peru really consisted of its minerals, which were to be found in the Cuzco Valley and on the eastern slopes of the Andes. In crossing the Cordilleras he had seen ample proof of this, and he considered that the money Peru was now spending in developing her mines and extending her railways was much better used than in revolutions and bloodshed. He had entire confidence in the ability of the country to carry out all the undertakings which had been projected.

Colonel CHURCH said he had visited all the country which had been described in the papers, and had travelled over nearly all the Peruvian railways, and could bear his testimony to the stupendous nature of the engineering works that had been undertaken in that country. The fact that two of the lines already reached an elevation higher than the summit of Mont Blanc was something to excite astonishment. The railroad of which the United States was so proud—the Union Pacific—attained only half that elevation. Lake Titicaca, the borders of which might now be reached by railway, is 12,505 feet above the level of the sea; while the summit-level of the road is 14,600 feet. Beyond that, however, on the eastern slope of the Andes, were the real riches of the country; and he had no hesitation in saying, that, when the railways of Peru reached the summit of the Andes, the development of the country would really begin, for the coast would then be in connection with the outlying feeders of the Amazon, and in the valleys drained by the head waters of the Amazon there were greater riches than were ever dreamed of. That region was entirely unexplored, but Peru was making noble efforts to demonstrate to the world the navigability of her rivers and the riches of her mines. The Amazon Valley had attracted great attention recently in the United States. Last November he had an interview with the President and the entire Cabinet, and explained to them the efforts which were being made to construct a railway, 153 miles long, around the cataracts of the Madeira. The President promised to call the attention of Congress to the subject, and this promise he fulfilled. He requested an appropriation for the purpose of making an exploration of the Amazon as far as the mouth of the Madeira, and of the Madeira as far as the Lower Falls, beyond San Antonio, a point 1500 miles from the mouth of the river. An auxiliary expedition was intended to cross the Andes by the Arequipa Railway, and all that vast river system which concentrates at the head of the Maderia. Application had been made to the Governments of Bolivia and Brazil for permission to send the expeditions, and no doubt Congress would make the necessary appropriation. The Bolivia and Madeira Railway, with which he was connected, would, when

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completed, open up 400,000 square miles of territory as rich as any other part of the world of equal size.

Sir HARRY VERNEY said he had no doubt that the statements which had been made with regard to the enormous wealth of the eastern slope of the Andes were perfectly correct. He had seen a great deal of the mining operations carried on in the neighbourhood of Coquimbo, and he felt convinced that if the European method of mining could be introduced into South America, enormous riches might be extracted from the hills. The only mode of getting the water from the deep mines of Coquimbo was to make great fissures in the rock and employ naked Indians to bring up the water in skins. The part of the Andes which he had crossed was to the south of lake Titicaca, and was a great deal higher than that referred to by Mr. Markham. He crossed it in winter, and at the highest point the snow was then 600 feet deep.

Mr. MARKHAM said that the cause of geography was greatly indebted to the President of Peru, Don Manuel Pardo, for the energy with which he had urged on the construction of the railways in spite of such stupendous difficulties. Don Manuel Pardo was not only a politician and an administrator, but he was also a good and sound geographer, and had written a memoir on the province of Jauja, which, for research, for the accuracy of the topographical details, and for the interest of the speculations which it contained, had seldom been equalled anywhere; the Fellows of the Society would therefore feel extremely gratified to know that the Council proposed to elect the President of Peru as an honorary corresponding member.

March 23rd, 1874.

ON THE ISLAND OF YEZO, AND PROGRESS OF GEOGRAPHY IN JAPAN.

THE President took the chair at 8.30. Among those present were His Excellency, Count Munster (the German Ambassador); Mr. Watson (lately acting Minister in Japan); Sir Rutherford Alcock; Mr. Mitford, the Japanese Chargé d'Affaires; Mr. Luzuki Kinso, Secretary of Legation; Sir Henry Rawlinson; Captain A. H. Markham, R.N.; and the Bishop of Madagascar.

Mr. R. G. WATSON read a paper "On Notes of a Journey in the Island of Yezo in 1873, and on the Progress of Geography in Japan." The author visited Yezo, the northernmost of the three main islands of Japan, last summer, and witnessed the results of the recent efforts of the Japanese Government to colonize the island. At present Yezo is placed on a different footing from that of all the other portions of the Mikado's dominions, being considered rather as a colonial possession, and governed by a special office, called the Yezo Colonization Department. Although richly wooded and picturesque, abounding in coal and other minerals, with salmon and other fisheries of surprising abundance, it is but very thinly populated, and would have continued in its neglected condition had not the Japanese Government been stimulated to action by the encroachments of the Russians in Saghalien, immediately to the north of it. The population does not exceed 124,000, of which number 16,000 belong to the singular aboriginal hairy race, called Ainos. The island is of about the same size as Ireland. Although lying ten degrees more southerly than Ireland, its climate is much colder; and Mr. Watson was glad to sit over a fire even at noon in the dog-days, and to sleep under a thick quilt at night; still the mangolia grows in its forests, and rice and maize are cultivated. He advocated the removal of the capital from Hakodate to Endermo, the latter place being more central, and having a magnificent harbour. With regard to the progress of our knowledge of the interior of Japan generally, the author said that Europeans are still forbidden to travel beyond the limit of 30 miles from the treaty ports; nevertheless, on one errand or other, Englishmen and Americans have traversed the largest island in various directions. In conclusion, he described the surprising change that had come over the attitude of the Japanese regarding foreigners. A few years ago, every traveller, even in the Yedo streets, carried, as it were, his life in his hands, and officials were forbidden to stir out without an armed escort: at present any foreigner can traverse, alone and unarmed, town or country without the slightest risk.

Mr. MOTONO MORIMICHI and Mr. LUZUKI KINSO expressed, through the President, their surprise and gratification at the interest shown by the audience in Japan.

Mr. A. B. Mitford and Sir A. Alcock also addressed the meeting.

FRENCH GEOGRAPHICAL SOCIETY.

Meeting of February the 20th.

M. HENRY DE LONGPERIER stated his views on the choice of a new initial meridian. He began by reminding the meeting that, for some years, the meridian had formed a subject of general discussion, and he gave a history of the various meridians adopted up to the present time. The first meridian adopted was that of Ferro, in the Canary Islands; but soon the seamen of each country, having to use astronomical tables computed for the observatory of their own country; they also adopted as their initial meridian that of their national observatory. At the Congress of Antwerp a proposition was made that the meridian of Greenwich alone should be used on charts, while the meridian of Paris alone should be used on maps. On the other hand, the Russians proposed the Straits of Bering for the initial meridian. M. de Longpérier thinks that France could give up the initial meridian of Paris, on condition that the new one should have no nationality.

When considering the figure of the earth and the history of its inhabitants, he thought that the most serviceable initial meridian would be one dividing into two parts the seats of ancient civilization: the basin of the Mediterranean and the basin of the Tigris and Euphrates. He reviewed the history of the eastern portion of the Mediterranean and the history of its western portion at a later date. He showed how the two parts of the basin had been separated in the administration of the Roman empire, as these had constantly been found apart in the political history of mankind; the eastern part, on the other hand, was divided between the Grecian-Christian, and the Muslim world.

M. de Longpérier proposed an initial meridian identical with the seventeenth degree east from Paris, which, in the south of Europe, passes between the Drina and the Drinus, in the north of Africa, through the bottom of the Syrt, at a point near to that where the altars of the Phileni have existed. He then stated the advantages which he thought such an initial meridian would afford. According to M. de Longpérier it would prove more convenient for the study of geography and history. Europe would be cut in two by such an initial meridian—the western portion would comprise the Christian world, Latin and German; the eastern portion would comprise the Oriental world, the Russians, Tartars, and Arabs. In North Africa, the two portions would correspond: on the eastern side, to Grecian Africa, including Egypt and Cyrenaica; on the western side, to Roman Africa; while to the south, it would pass between the Indian and the Atlantic Oceans. The 180° would also separate two groups, one including India, Indo-China, Australia, and Japan, and the other including America. The ground of M. H. de Longpérier's argument on an essentially geographical question is purely historical, which was pointed out in the discussion that ensued.

M. de KHANIKOFF rightly observed that astronomy and the science of navigation are by far more interested than

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history in the question of the initial meridian. He said that the reason why the Geographical Society of St. Petersburg had recommended the meridian of Greenwich, or rather a meridian very little different from that, was the great number of geographical documents published with the initial meridian of Greenwich, and the fact that the most complete astronomical yearly tables contained in nautical almanacs are computed for the meridian of Greenwich, and these are used by all navigators.

M. PERIER also objected to M. de Longpérier's idea as it would cause complications instead of simplifying. In his opinion, if a new initial meridian were adopted the whole of Europe would be left on one side of that meridian.

M. MALTE-BRUN proposed that the question should be brought before the next international Geographical Congress.

Meeting of March 6th.

THE President, M. DELESSE, was in the chair, and the Abbé DURAND, one of the Secretaries, read the minutes of the last meeting.

M. DELESSE announced the results of the transactions of the Council on the subject of the members who are to compose a series of questions to be debated in the Geographical Congress of 1875. These questions will be distributed over six sections: the first comprises mathematical geography; the second, physical geography; the third, economical geography; the fourth, historical geography, and the history of that science; the fifth, teaching of geography; and the sixth, travels and explorations. He further announced a resolution of the Council to grant 10,000 francs for the preparation of the Congress.

The General Secretary then read extracts from a letter received by Admiral de la Roncière Le Noury, giving some further particulars respecting Francis Garnier. It appears that as soon as the small expedition under Garnier arrived at Tong-king, signs of distrust became manifest, which were soon followed by secret hostility, and, at last, by measures against which he on more than one occasion protested, but without success. Finding himself in such a position, and in order to escape being obliged to put to sea, he determined to avert the danger by means of a well-conceived plan. On the 21st of November, with about a hundred men, he captured the citadel of Hanoï, which was defended by several thousand soldiers. The great marshal—a deadly enemy of the French—and two of his partisans, the sons of Phan-Tau-Gian, were also captured. For more than six years these persons had been the instigators of all the insurrections in Lower Cochin China. The events that followed are little known. It is simple justice to bring forward the eminent services Francis Garnier rendered by the capture of the great marshal Nguyen-Tri-Phuong, who died on the 20th of December from the effects of his wounds. By taking him prisoner M. Garnier has apparently secured the success of the policy of the Government of Cochin China. The Admiral-Governor of Cochin China has recommended to Government that Francis Garnier be nominated a captain of frigate from the 21st of November, for the capture of the citadel of Hanoï. After the taking of the citadel, M. Garnier recommended rewards for the most meritorious of his companions in arms, thus adding one more to his many eminent qualities. The Société de Geographie has lost in M. Garnier one of its most active, devoted, and useful members, whose labours had been for the benefit of all nations.

M. LEVASSEUR tendered his thanks to the author of the letter, and wished to lay a proposition before the Society. He referred to the sum of 3000 francs voted to Francis Garnier for his travel to Tibet. In summing up Garnier's pecuniary sacrifices to the cause of geography, his exploration of the Yang-tsze River at his own expense, he concluded by proposing that the 3000 francs alluded to should be handed over to his family as a very slight indemnity.

The PRESIDENT recalled the services of Francis Garnier, who had so well deserved of science and of France, which was received with unanimous approbation.

M. GORCEIX then gave an account of Macedonia, Thessalia and Epirus, being a summary of his own explorations made in those portions of Turkey in the years 1870-1872. His object when travelling in those countries had been to fill up some blanks in the map of Turkey by Kiepert. The outlines of the region of Ekassia were wanting; other portions of the map of Turkey are as unknown as portions of the map of the interior of Africa. M. Gorceix traced his routes upon his own map as he had surveyed them by means of a pocket compass with cross staff, and of a circumferenter constructed by himself. This outline completes the map by Kiepert, where, be it said by the way, the Olympos and Gossa could have been drawn more accurately if Kiepert at the time of its compilation had made use of French works already published. M. Gorceix based his itineraries upon the position of the places already ascertained.

The field of his observations is the region of Ekassia, extending from one day's journey north of Larissa, between the Olympos to the east, the Pindos to the west, and the line from Zarkos to Amasi to the south. He entered the range of mountains by the passage of Danazi. The line of culminating heights extends in the general bearing north and south. To the north, four peaks emerge out of the range of mountains, of which Mount Pyronos is the highest. On the western slopes the soil is barren, cultivation existing only in the mountains of schist. The eastern slopes are far more fertile. These show metamorphic rocks, crystalline rocks, and schists, as well as sand, marl, and tertiary rocks, consequently vegetation is here luxuriant. Such being the composition of the soil, it is easily swept away by natural agents, hence the many ravines and varied watercourses. Kiepert has given quite a faulty drawing of the hydrography of that region. The torrent of the Shutza, descending from the last buttresses of the Pindos, falls into the Yakmuna, while other torrents go to the Nistritza. On the western slope the Xerais unites with the Xerandakouros.

The centres of population are of little importance. M. Gorceix fixed with the compass the positions of about fifty or sixty villages. There is only one town. Dissikata is not a town, but only a very small village—what is called a *tshiflik*, or property of farmers. Most of the inhabitants are Greeks; Turks being found only in the tshifliks. Another element of the population, although unimportant in number, deserves notice. It is the Walachian shepherds, who are merry and frank, and sing at every feast, and who make use of the name of the Latin race. They informed M. Gorceix that they were Frenchmen. Such Walachian shepherds are found even in the Olympos. Here M. Gorceix observed the analogy of the tendencies of Panslavism in the Orient with the tendencies of Pangermanism in the Occident.

He further rectified the course of the Ayakmoun and that of the Nistrizza. The Ayakmoun passes between the mountains and issues in the plain of Servia. M. Gorceix noticed in that part of the country some villages with peculiar inhabitants. He described a defile which offers a passage for a route to be constructed between Macedonia and Saloniki. In the village of Tshurkli he made archæological discoveries—a temple of Esculape, and medals. In another village he found broken vessels under the bed of humus. At the village of Laya M. Gorceix again corrected the course of the river passing by.

Nowhere did the traveller see Albanians of a pure blood. The tongue generally in use is the Greek, but

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Turkish is also spoken. The peculiar division of the centres of population is worthy of mention. Villages are either κεφαλοχωροι or tshiflik. In those of the first class, the peasant is landowner; in those of the second class, the peasant is not a landowner, the landowner being a man who does not cultivate.

H. D.

BULLETIN OF THE FRENCH GEOGRAPHICAL SOCIETY.

Adventures of Norwegian Fishermen in Novaya Zemlya.

FROM the pen of M. Hepp, French Consul at Christiania, we have, in the February *Bulletin*, an account of the adventures of seven Norwegian fishermen who accompanied the late Captain Tobiesen in his unfortunate trip to Novaya Zemlya in the summer of 1872.

Captain Tobiesen of the 'Freya' had completed his season's seal-hunting towards the end of September, and was on the point of returning to Norway, when he was beset by ice off the western coast of Novaya Zemlya. After every effort to get free had proved unsuccessful. Tobiesen announced to his crew, which consisted of nine men exclusive of his own son, that the provisions would, at the best, keep no more than four or five during the winter months. On hearing this, seven decided on leaving the vessel, and they were accordingly supplied with a boat, a couple of guns, some powder and shot, a compass, telescope, fourteen biscuits, some tea and molasses, a few pounds of bear's meat, a saucepan, kettle, hatchet, and a few boxes of lucifers. They then started off, leaving behind the captain, his son, the first seaman, and cook. Of the melancholy fate of these four men we have already made mention (see *Ocean Highways* for October, 1873, p. 308). The others, as will be seen, were more fortunate.

After dragging their boat over ice for about two or three leagues, they managed to put to sea, and turned their course southward towards Waigatz Island. Their slender stock of provisions was soon spent, but they providentially fell in with a bear and some seals, and these kept them alive during their cruise, which, however, darkness and frequent storms rendered one of great peril. Three weeks had elapsed (but without an almanac they were not quite sure of their reckoning), and they had travelled about 50 miles, when the party came in sight of two deserted huts on the coast of Goose Island. In these quarters they rested for about three weeks to recruit their strength, their feet being all swollen and some of their limbs frost-bitten. They killed a seal, two Arctic foxes and four reindeer, and no more game having ventured near, they set out southwards marching along the coast, two of the party carrying the guns and ammunition, and the remainder dragging along some sledges, found in the huts, laden with their goods and chattels. A terrible snow-storm soon arose, and the two carrying the weapons lost sight of their five comrades. The position of the latter was now very critical. Their only food consisted of a little reindeer flesh and lard, the weather was terribly severe, their clothing was much too scanty, and there was no water. Lots were cast to determine which way they should go—back or forwards—and Providence ordained that it should be the latter. At night a hole was dug out in the snow, and while one mounted guard to keep off bears and to prevent their being buried in snow, the rest slept. On the sixth night one of the party succumbed, and the survivors were so worn and enfeebled that they were obliged to leave their sledges and baggage behind, and proceed without them. But help was at hand. A day or two afterwards some sledge marks were discovered, and after following these for some distance they reached a hut inhabited by Samoiedes, three men, three women, and a boy. These solitary outposts of civilization spoke Russian, and greeted the tired travellers most cordially. Their hut was situated at the southern extremity of Goose Land, and they caught seals and walruses which they sold at Petchora. They sheltered the Norwegians till the month of March, when all the stock of firewood being exhausted, compelled them to pull down the hut and set up a tent of reindeer skins. One of the Norwegians fell ill, but the hospitable Samoiedes still continued to share their clothing and food with their guests, and even offered to go and bury the body of the Norwegian who had died on the way.

Towards the close of April the Norwegians were astonished by the arrival of the two who had been separated from them by the snow storm. Theirs was indeed a story of endurance. The two, Olsen and Nilsen, on finding themselves alone, with nothing but two guns and a pound of meat, had striven to regain the huts they had left. Nilsen was the first to arrive, and having lighted a fire and cooked some food, lay down to sleep; some hours after, Olsen, who, in the meantime to keep himself alive had eaten some of his coat of fresh reindeer skin, came up, but was too weak to enter the hut, and lay down to rest in the boat outside. After picking up strength a bit he managed to enter, and found Nilsen asleep by the fire, which was still burning. He ate the fragments of Nilsen's meal and soon fell asleep. The next morning the two sailors made preparations for their wintering. For a fortnight they were unable to kill anything, and subsisted on some scraps of food left by former tenants of the hut; but towards Christmas an inquisitive reindeer ventured too near and paid the price of his curiosity with his life. Fire was obtained by flint, steel, and some old rope, and fuel running short, a portion of the hut was pulled down, and the wood cut up by means of a knife, extemporized out of a piece of iron belonging to the boat, knocked into shape with a stone; a few nails were fashioned into needles, and reindeer skins supplied them with the material for clothes. Eleven reindeer and a bear were killed, and these afforded them food till April, when, having but three charges of powder left, they struck camp, and a few days later most fortunately fell in with their comrades.

Six weeks afterwards the frost broke up sufficiently to enable five of the Norwegians to go back and fetch their boat; this they brought with them, and putting out to sea, eventually reached the edge of the pack near Waigatz Island. Here they were entertained by another party of Samoiedes, who took them southward in reindeer sledges, and then put four of the rescued seamen on board a Norwegian vessel, two having remained behind, allured by the charms of Samoiede hospitality.

The Silver Mines of Caracoles in Bolivia.

IN the month of March, 1870, some agents of Messrs. Diaz-Gana and Arnous de Rivière, whilst travelling in the southern part of Bolivia, hit upon some veins of silver, situated about 100 miles inland, and returned with the news to the port of Cobija. On hearing of this, Messrs. Diaz and de Revière started for the interior. They named the spot Caracoles, meaning in Spanish an assemblage of shells, from the great number of fossils discovered there. The proprietary rights of the mines have now passed into the hands of companies, M. Diaz having sold his interest for 300,000*l*., and M. de Revière, who stood out a little longer, for about 400,000*l*. There are four routes by which Caracoles can be reached. The longest one is from the port of Tocopilla, and along it relays of carts have been provided by a company in Valparaiso. The second, from Cobija, which is the only way into the interior of Bolivia from the south, attains a height of 5000 feet, and was, until latterly, practicable only for mules. The third is from Mexillones and along this line a railway is being rapidly constructed, and by the end of the year will be probably half done; although this is actually the shortest route of all, the curves which the railway has been obliged to take will greatly increase its length. The harbour of Mexillones is the best on the west coast of South America. The fourth and last route

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is from Autofagasta or Chimba, and being provided with four post-stations is well frequented now, but will eventually cede, of course, to that from Mexillones, when the railway is built.

The mines discovered are of great promise, yielding from half to one per cent. of metal, while those first found were twice as rich.

Articles of food are still very dear in the district, but a change may fairly be anticipated, as the annual outturn of silver amounts in value to about 300,000*l.*, at a working cost of about 40,000*l.* The population of the district is about 6000, the majority of which are Chilians.

Dr. Nachtigal in Central Africa.

THIS persevering German traveller has not only penetrated as far as Wadai, a country east of lake Chad, but has even succeeded in despatching from the town of Abu-Cher a letter to Europe by way of Tripoli. He does not state by what route he managed to reach Wadai, but it was very probable by the south of lake Chad, as the delta of the Shari in this direction is a feature which merited close investigation, and which the Doctor is pretty sure to have given his attention to.

Wadai is a poor country partly owing to the lack of water and partly to the lower state of civilization of its inhabitants. Their straw huts are very inferior to those of Bagharmi to the south, and the people themselves are cruel, suspicious of strangers, and quarrelsome. They are in the habit of drinking a sort of beer called *melissa*, which excites them so as to cause the Arab merchants to remain indoors until the close of the day for fear of encountering violence outside. But under the rule of the new Sultan Ali, a great change has been brought about. His punishments are extremely severe, and his firm hand has caused commercial engagements to be much more respected, and so has brought about increased intercourse with strangers. The credit of opening up communications between Wadai and the port of Ben Ghazi on the Mediterranean belongs to a former Sultan, Abd-el-Kerim Sabun. But now the caravans from Wadai take their slaves, ivory and ostrich feathers in the direction of Egypt.

Dr. Nachtigal has been trying hard to recover the books and papers formerly belonging to the traveller Edward Vogel, who was murdered at Abu-cher in 1856. As, however, the murder was committed by order of the present Sultan's father, the doctor's investigations had to be carried on carefully, for fear of offending Sultan Ali.

There is much disturbance and strife at present in Dar-Fur, the adjacent country to the east. Should matters become more quiet, Dr. Nachtigal will return through this country to Khartoum, in spite of the approach of the rains, which render travelling difficult. On the other hand, should there be no chance of succeeding in this direction, he will have to set out northward by way of Ujanga, Jalo and the Sahara to Tripoli, a very much more trying route and one which will render necessary the provision of a good number of camels.

Other articles in the February *Bulletin* are an account of the country to the south-west and west of Algiers, adjoining the empire of Morocco; an article on Anglo-Saxon colonization in the Fiji Islands, in which the author, M. Jules Girard, draws attention to the great advantage derived from these islands forming a coaling station for vessels plying between Panama and Australia and a description of the ethnographical museums of Moscow and Copenhagen.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

AT the General Meeting of this Society on the 21st of January last, when several distinguished Englishmen were present, H.R.H. the Duke of Edinburgh was unanimously elected an Honorary Member. The Secretary announced the return of Messrs. Prjevalski and Pyltsef from Tibet, and gave notice of the despatch of an expedition in the spring of this year to China, from whence it is to proceed along the banks of the Yang-tse-kiang River by Khamil to the Irtysh, exploring the country with the view of establishing a better system of commercial relations with China. The object aimed at is to divert all the Chinese trade from Kashgaria, by forming an entrepôt at a point somewhere to the east of Kashgar, from which the main traffic may proceed northwards. Messrs. Sasnofski and Matousofski, who are to lead the expedition, have already left St. Petersburg. The latter is well known by his recent explorations in the direction of Kobdo and Urumtsi.

The Secretary next read a letter addressed by the Vice-president to General Kaufmann, in which the Governor-General of Turkistan was requested to advise the Society as to the opportuneness and practicability of taking the best advantage of the great extension of the Russian dominions in Asia, and of the establishment of regular relations with the various Khanats by sending exploring parties from three different parts of the province under his charge, viz., from the Semirechensk district to Urumtsi, Turfan and Kashgar (this probably with a view to meet Messrs. Sosnofski and Matousofski), from the Naryn to Djetyshar [Kashgaria] and to the Oxus, as well as to its supposed ancient bed as far the Caspian Sea.

At a meeting of the Statistical Section of the Society, the Secretary read a communication from Mr. Baronofski on the subject of a Railway to Central Asia. Mr. Baronofski proposes to lay a line from Saratof on the Volga, across the Ust-Urt by Kungrad to Chardjui and Khilef. The total distance of this line would be 1500 miles. This project, however, met with no favour, for it is anticipated that M. de Lesseps will construct a line which, running along the northern districts of the Turkistan Province, with a feeder from Tashkend and Bokhara, will pass to a terminus somewhere in the north-eastern portion of Kashgaria, by which means Russia may develop her relations with China.

At a meeting of the Geographical Section of this Society, held on the 19th instant, General Heine, late in the United States Service, read a paper on the progress of civilization in Japan, in which he related the following remarkable story:—A young Japanese who was sent to America to study, receiving from his Government an allowance of 1000 dollars per annum, embraced Christianity and became a Methodist. According to Japanese law he was punishable by death. Considering he was bound to notify the fact to his Government, he wrote home and renounced all further claim to his allowance. The Government of Yedo thereupon instituted inquiries in America, into the manner in which the young man was following his studies; the result of these being in his favour, all the reply that he obtained from the Japanese Government in answer to his notification was an increase of his annual allowance to 1500 dollars.

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THE

GEOGRAPHICAL MAGAZINE.

MAY, 1874.

DAVID LIVINGSTONE.

On Saturday, the 18th of April, the remains of the great traveller were deposited under the nave of Westminster Abbey, near those of Major Rennel, one of the founders of the African Society, and the staunch friend and adviser of Mungo Park. They were followed to their last resting-place by the President, Secretaries, and leading members of that Geographical Society which, for upwards of a quarter of a century, had been Livingstone's firm and constant friend, through good report and evil report, and in whose map-room the body had rested since its arrival in England. On Sunday afternoon there was a special service in the Abbey, in memory of Dr. Livingstone, when the Dean preached a sermon, in which he dwelt on the nobleness and grandeur of a traveller's vocation, and on the special character of the labours of that illustrious explorer who had now found a last resting-place at Westminster.

Dr. Stanley said, "that through the indomitable energy of Livingstone, we have revealed to us for the first time that vast tract of Central Africa which, to the contemplation of the geographer, has been literally transformed from a howling wilderness into the glory of Lebanon. The blank of unexplored regions which in every earlier map formed the heart of Africa, is now disclosed to us, adorned with those magnificent forests, that chain of lakes, 'glittering'—to use the native expression—'like stars in the desert;' those falls more splendid, we are told, even than Niagara, which no eye of civilized man had ever before beheld, where above the far-resounding thunder of the cataract and the flying comets of snow-white foam, and the rising columns of ever-ascending spray, and the bright rainbows arching over the clouds, the simple natives had for centuries seen the emblem — the glorious emblem — of everlasting Deity — the unchangeable seated enthroned above the changeable. And to his untiring exertions, continued down to the very last efforts of exhausted nature, we owe the gradual limitation of the basin within which must at last be found those hidden fountains that have lured on traveller after traveller, and have hitherto baffled them all. There was implanted in him a love for the African race. He always loved to dwell on their individual acts of kindness. He reiterated his assurance that their moral perceptions of good and evil are not essentially different from ours, and out of this sense of his fellowship with them as children of the same heavenly Father and of the possibility of embracing them within the fold and flock of the same heavenly Shepherd, there arose, as he wandered on amongst them, the passionate desire, ever mounting to a higher and yet higher pitch of burning indignation and fierce determination, to expose, and exposing to strike, a fatal blow at that monster evil which, by general testimony, is the one prevailing cause of African misery and degradation—the European and Asiatic slave trade. He grappled with it as with the coils of a deadly serpent, and it recognised in him in turn its most formidable foe. Each strove to strangle each, and in and by that struggle he perished, too soon, alas! for him to know how nearly he had succeeded—not, we trust, too soon for us to secure that his success shall be accomplished, and the work which in its commencement and continued inspiration was the brightest side of the name of Wilberforce shall in its completion shed the chief glory on the name of Livingstone. Such he was as an explorer, such as a philanthropist. What was his peculiar place as a missionary? It was a very peculiar place indeed. He was a missionary, not only as ordained for that work by the hands of a small group of faithful ministers, some of whom yet live to see how he followed out the charge which they had laid upon him, but as fashioned for the work by special gifts of his Creator. Preacher he was not, teacher he was not. His was not the eloquence of tongue or pen. His career was very different from this, and by that difference singularly instructive. He brought with him to his task the absolute conviction, not only, as I have said, of the common elements of humanity shared alike by heathens and by Christians, but of the common elements of Christianity shared by all Christians. Himself born and bred in one of the seceding communions of Scotland, allied by the nearest domestic ties and by his own missionary vocation to one of the chief Nonconformist Churches of England, he yet held himself free to join heart and soul with all others. For the venerable Established Church of his native land, for the ancient Church and the Liturgy of this country—with one of whose bishops he laboured as a brother through good report and evil—even for the Roman Church of Portugal and the disciples of Ignatius Loyola, from whom in theological sentiment he must have been farthest removed—he had for all and each of these his good word of commendation. If he freely blamed, he also freely and justly praised. He remained faithful to the generous motto of the society which sent him forth. 'I never,' he said—strange

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and rare confession—'I never, as a missionary, felt myself to be either a Presbyterian, Episcopalian, or Independent, or called upon in any way to love one denomination less than another.' Followed to his grave by the leading Nonconformists of England, by the staunchest Presbyterians of Scotland, all the Churches may claim him as their own. All English-speaking races may regard him as their son. But the most profound and powerful missionary agency as proclaimed both by his teaching and example, is that of individual character. The most expressive in itself and in its transparent simplicity is that testimony which he rendered years ago. 'No one,' he says, 'ever gains much influence in Africa without purity and uprightness. The acts of a stranger are keenly scrutinised by both old and young. I have heard women speaking in admiration of a white man because he was pure, and never was guilty of secret immorality. Had he been so they would have known it, and, untutored heathens though they be, they would have despised him in consequence.' He was loved and feared, not as a magician or a spectre, but as a just and kind benefactor."

Dr. Stanley, towards the end of his sermon, touchingly alluded to the warm friendship between Livingstone and Sir Roderick Murchison; and to the satisfaction which, had he lived, would have been felt by the venerable President of the Geographical Society at the last honours paid by the nation to that illustrious traveller, to whom he had ever been so true a friend.

GEOGRAPHICAL NOTES ON THE BASINS OF THE OXUS AND THE ZARAFSHÁN.

(By the late Alexis Fedchenko).

THIS eminent traveller, some months before his lamented death, wrote to me that Mrs. Fedchenko had been engaged in translating into Russian the Essay on the Oxus countries which I had furnished to the new edition of Wood's journey, and asked about some points requiring explanation. This led to a correspondence, of great interest to me, which was cut short by the sad accident at Chamouni. The translation was published in the *Bulletin of the Imperial Geographical Society of St. Petersburg* (No. 6, 1873), and was accompanied by very copious notes and elucidations, filling, in fact, thirty octavo pages, written by M. Fedchenko himself, frequently aided, as the writer mentions, by his accomplished countryman M. N. de Khanikoff. Though naturally gratified that two men so distinguished should have thought my Essay worthy of their commentary, it is only recently that I have been able to obtain a translation of their remarks (into French). I find a great deal of the matter of so much interest and value to geographers that it occurs to me that a rendering of selected notes may be acceptable to the readers of the *Geographical Magazine*. I have added some fresh remarks of my own where it appeared desirable, but I need scarcely say that in such circumstances there has been no desire for controversy.

The best map to refer to in connection with these notes is the English version of the map purporting to be M. Fedchenko's own, which appeared in *Ocean Highways* for August last ("Map of Kokand and the Upper Syr-Daria"). I say "purporting to be Fedchenko's" because, as he mentioned in his letters, and as he repeats on several occasions in these notes, the map, after passing out of his hands, underwent considerable modification, at least in that part of it which represents Hissar and the adjoining districts immediately north of the Oxus. These modifications were, certainly in some respects, for the worse.* But M. Fedchenko had prepared another map to illustrate his wife's translation of the Oxus Essay, which, taking my map of the Oxus countries (see *Ocean Highways* for March, 1873) for basis, introduced into the northern part of the Oxus Basin such corrections as his better materials enabled him to make. This map has not yet, I believe, been published, and it is much to be regretted. The references to the Essay are to the *first* issue, as I have at present no copy of the second (see *Ocean Highways* for February, 1874, p. 475).

The gentleman to whom I have been indebted for the French version of the notes, tells me that he found the style difficult to render; and indeed, some of the more important notes, involving orographical description and the like, are as yet a little obscure to me, and have been omitted from the present selection.

I. *Solomon's Throne at Osh.*

In section 7 of the Essay (p. xl.) reference is made to the notion of Wilford and Heeren, that the famous Stone Tower which marks the path across Imaus, *i.e.* Pamir, in Ptolemy's route of the Sevic caravan, was an ancient structure, or excavation reported to exist at Osh in Ferghana, and known as the Chihil Sitún ("forty columns") or the Takht-i-Suliman ("Throne of Solomon").

Though Ritter considered this identification of the route to be established past question,* more recent knowledge has rendered it extremely improbable that it lay through Ferghana (*i.e.* Kokand) at all; and what M. Fedchenko says throws doubt on the real existence of any structure which could be connected with the Turris Lapidea :—

Note 1.—"The antiquities of Osh were visited by us during our journey in Kokan, and are described in the narrative which is now being prepared for the press. Takht-i-Suleiman is the name of a hill almost completely surrounded by public gardens. Near the eastern foot of the hill there are some remains, but they are all comparatively modern, and in the Musulman style."

We can scarcely judge how far this is absolutely conclusive till we see Mrs. Fedchenko's publication of her husband's narrative, completed by herself, which is now under preparation in an English dress. What Moorcroft's employé, Izzab 'Allah, says, is only this :—"Osh is celebrated by the name of Takht-i-Suliman, and the tomb of Asof Barkhia, the Vizir of Suliman, is still shown here : it is of great size. The Throne of Suliman is on a small hill west from Osh, surmounted by a building with a dome. In the spring great numbers of people repair hither in pilgrimage to the tomb" (*J. R. A. S.*, vii., 324). Nazarov, who travelled in 1813, and whose journey was translated by Klaproth, says :—"At the custom-station of Osh the caravans to and from China pay duties. To the right of the road we saw afar off, in a narrow valley of the Kashgar-Divan, two ancient edifices, under which there is a great cave. Our guide said this was the Takht-i-Suleiman" (*Magaz. Asiat.*, i., 58-59). These notices amount to very little, and I cannot now refer to Wilford's, which was, I believe, the original basis of the belief in the existence of remarkable remains of great antiquity at Osh.

II. *Documents of the Russian War Office and English Foreign Office. (Essay*, p. li).

Note 4.—"The documents which Colonel Yule calls 'apocryphal,' are extremely remarkable, and in their way unique. I have seen both that at St. Petersburg and that which the English bought from Klaproth. The latter is undoubtedly a forgery of Klaproth's, and he got a large sum from the English for it. As regards the first, it is by no means admitted by everybody to be a forgery, and it is extremely difficult to see how it could be the work of Klaproth, who, in the year when the document was received at the War Office (1806), was at Peking. Serious and acute objections have been made to Sir H. Rawlinson's views by M. N. de Khanikoff (*Proc. R. G. S.*, x., 301). Whatever be the truth as to the Russian manuscript being the work of one who really made the journey, it is, if I may judge by those parts of the itinerary which refer

* M. Fedchenko's letter says this was done in "the Russian *General* Office." Some word seems to be omitted, so I do not known what office is intended.

* *Nunmehr wohl unzweifelhaft* (viii., 693).

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to places visited by myself, far too confused to be of use for geographical purposes."

I have no intention of re-opening this almost threadbare discussion, but only to indicate that the alleged date of the reception of those documents into the Russian archives is very precisely questioned in the page on which M. Fedchenko was commenting. I cannot hesitate to state my conviction that when the evidence of the Russian office shall be submitted to the examination of unbiassed persons it will be found that those documents, instead of having been received in 1806 (a date which, as I have pointed out on the page in question, is "*really the date of the letter of the pretended traveller, which is attached to the series*, i.e., *it is an organic part of the fiction*"), were really received in some year between 1816 and 1826.

III. *Kizilyart Mountains.* (*Essay*, p. lviii).

Notes 16, 17.—"I write *art*, the English write *yart*. The word art is applied by the natives to a mountain pass. I look on the application of the term to the whole chain as inappropriate. We have already made confusion enough by the application of the term Kashgar-Daván (Kashgar Pass), extending it from the Pass itself to the whole chain; the consequence of which is that as far west as Khojand we still find 'Kashgar Daván' to the south of us!"

Kizilart, or -yart, meaning therefore "Red-Pass," was the name which Hayward learned to apply to the high mountains which he saw west of Kashgar, and which M. Fedchenko, who looked on them from the Alaï steppe, bounding it on the south, called Trans-Alaï. It does not seem to me that the objection made by the respected annotator is of any great moment. There are very few *genuine* proper names (so to speak) of mountain chains. The name of *Grampians*, as applied in modern geography books, is as much an invention of geographers as Kizilyart or Kashgar-dabán. Geographers must have names for mountain ranges, as geologists must have names for rocks and systems, though they do not in general so *consciously* invent them, but usually fancy that they are adopting an indigenous name.* A large number of geographical names of mountain ranges, generally accepted, will be found to be merely names of passes, extended to the ranges which are crossed by them. And why not?

Some precise folk even object to our saying the river Hwang-ho, or the river Karà-sú, because *Ho* and *Sú* mean river. On the same principle we ought to object to the river Esk or the river Avon, the river Dee or the river Don, nay even to the river Rhine, for all these names have been supposed to be words of like signification to *Ho* and *Sú*.

On the other hand, names like Trans-Alaï are really confusing, at least until we become callous, by habitual use to their etymological meaning, as in the case of *ultramontane*.

As we are on the subject of names of passes and ranges I will recur to Karakorum, as to the meaning of which we had some discussion last year (see *Ocean Highways* for July, 1873, p. 170). I there disputed the statement that Karakorum meant Black Mountains, and quoted Captain (now Lieutenant-Colonel) Henry Strachey for its meaning "Black *gravel*." I recently had the pleasure of receiving a letter from our Envoy at Kashgar, who mentions that he had read the letter in question *in situ*, *i.e.*, on the Karakorum Pass, and then and there made enquiry.

"*Korum*," he says, "is not exactly gravel, as we use that word, but rather the sharp-pointed *débris* of fallen rocks which break up into pieces. The term Karakorum is not merely applied to a pass, but is given to any place where these *débris* are found. For instance, on leaving the Karakash River, and marching up the ravine leading to the Sanju Pass, we found the valley covered with these sharp-pointed *débris*, and the Kirghiz call the place Kichik (Little) Karakorum."

IV. *Abramoff's Expedition to the Iskander Kul, &c.*

There is a long and valuable note (23) on the orography and hydrography of the upper part and southern side of the Zarafshan Basin, but it is one of those which require a little further consideration to do justice to them, and I will here only quote an incidental passage.

In the Essay (p. lix) mention is made of Mácha and other tracts near the remote sources of the Zarafshán as counting among the most unknown regions of Asia.

"This can no longer be justly said," says M. Fedchenko, "since the famous scientific expedition of General Abramoff! Not only has the physical structure of the region been examined and elucidated, but also positive details have been collected regarding the people and political organization of those districts. Mácha and the other Beg-ships have ceased to exist since the day when the whole region (called now-a-days, by the Russians, Kohistán) was annexed to the Zarafshán territory.

"It is surprising that none of the results of the expedition have come to Colonel Yule's knowledge; for they have been published by those who took part in it, viz., by M. Muishenkoff, M. Grebenkin, and myself. Latterly it has been announced that a description of the orography and topography of the Kohistán, from the pen of M. Aminoff, chief of the surveyors with the expedition, will appear in vol. iii. of the Annual Collection of the Committee of Statistics."

I plead guilty to ignorance of the results of General Abramoff's expedition. Ever since I heard of it, in Mr. R. Michell's translation of Fedchenko's previous sketch of the Zarafshán Topography (*Journal R.G.S.* for 1870, p. 449), I have been looking out for a report of this important exploration, but except a brief notice in Sir Roderick's last Address to the Society (*Proc. XV.*, p. 288; *Journal R.G.S.*, xli., p. clxxxii), not a word, so far as I can find, has been made accessible to English geographers on this subject. If it is impossible for any Englishman not called Michell to learn Russian, and against the principles of Parliamentary Government to give any encouragement to that study, for fear of interfering with private enterprise and the laws of supply and demand, could not our wealthy Society find means to induce a competent Russian, or some foreign scholar acquainted with Russian, to supply its *Proceedings* regularly with translations of important geographical matter?

More than four months ago Mr. Ney Elias informed me that an actual visit to the long-sought ruins of Karakorum had at last been reported to the Imperial Geographical Society of St. Petersburg by M. Paderin. From that day to this I have sought in vain for further information either in the *Proceedings of the Royal Geographical Society*, or in ——— a Geographical Review that shall be nameless!

V. *Gaseous Exhalations in the Kohistán of the Zarafshán.*

On a reference (p. lix) to Lehmann's mention of a "burning mountain" in this region, which he explains as being a coal bed on fire:

Note 26.—"This was entirely confirmed when the expedition of 1870 explored this mountain, called Kán-tágh. From different fissures gases escape at so high a temperature that pieces of wood placed in them speedily catch fire. A tea-kettle, which we set in a stream of these heated gases, very soon boiled, and MM. Muishenkoff, Kuhn, and I had the refreshment of a cup of tea. A few yards lower down the escaping gases are rich in sulphur, which deposits on stones with which the natives stop the orifices. At one point the vapours are emitted in extraordinary quan-

* Pere Huc never seems to have arrived at a knowledge (which yet it is not difficult to gather from his own book) that the Tibetan *La*, which he heard applied to so many mountain ridges, did not mean *mountain* at all, but *Pass*, like Col, Kotal, Dabán, Art, Ling, &c. And so he gives an absurd etymology of Potala the Vatican of the grand Lama, as being "Buddha-La, the Hill of Buddha!" The most absolute example of the nomenclature referred to above is, I suppose, that of "the Ghats," *i.e.* the passes, as applied to the well-known range of Western India.

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tity in contact with an enormous limestone rock, the surface of which they erode. The singular aspect of this rock, half hidden in a floating mist of mephitic vapours, dwells in my memory as one of the most surprising natural phenomena in Turkistan. If this country were a resort of tourists, this rock would become a regular lion. It would be desirable to make a special study of this spot. The products would indeed not be precious, consisting as they do (chiefly) of sulphur and alum; but the phenomena should be of the highest interest to the mineralogist, and might furnish data regarding the formation and modification of a variety of substances. My visit to the Kán-tágh vividly recalled one which I had made to Vesuvius a little after the great eruption of 1868; there were the same masses of mephitic vapour, the same sulphureous smell, the same burning soil. Nevertheless, the phenomena of the Kán-tágh are entirely due to a subterranean conflagration of coal-beds, which we see in many places cropping out on the surface."

Note 28.—"According to native statements flames do appear on the Kán-tágh, but only at night, and occasionally when the gases are discharged in unusual quantity. It is not to be supposed, however, that the incandescent gas rises to a great height above the ground, but only that the copious clouds of vapour which rise reflect the glow from the fissures. And this effect can only be seen from the vicinity, so that one cannot conceive that Mas'údi saw it from a distance of 100 parasangs!* Might it not have been rather an aurora borealis which he witnessed?—a possible circumstance, as is proved by the aurora which appeared in October 1870, and which was seen also at Tashkand.† It is very probable that the natives would attribute such a phenomenon to combustion of the ground. And, after examining the passage in Mas'údi, I am satisfied that it does not refer to the Kán-tágh. In fact, he represents the burning ground, discharging mephitic gases, as situated on a road between Khorasan and China; and he says that, notwithstanding the difficulties of the passage, travellers preferred that route as the shortest. Now, the position of the Kán-tágh is quite secluded even from village roads, and no one frequents it but those who go to gather sulphur. I am told that there is another spot, to the north of the province of Hissár, called Khoja-i-Áb-i-Garm (quite distinct from Karategin Áb-i-Garm), where the phenomena of the Kán-tágh are repeated in a form even more energetic. May not this place be on a once frequented road?"

On the last point I can say nothing. But one expected to find the remarkable place described above to be identified as the actual site of the Sal-ammoniac deposits, of which so striking an account is given by old Arab geographers, and to which Sir H. Rawlinson has alluded in the passage just referred to in a note. Take (*e.g.*) Edrisi's notice, which is briefest:—"On the flanks of these mountains" (viz. of Botm—certainly embracing the site visited by Fedchenko and his party) "one finds at intervals numerous orifices emitting vapours which are like smoke by day, like flame by night: it is from these that is collected the best Sal-ammoniac" (*Jaubert's Edrisi*, i., 486). And the name under which the substance is sold points to this district as its source. M. Fedchenko says:—

Note 27.—"I have indeed seen the ammoniac of Fán (Fán-Naushádir) in the bazars; but I have never witnessed its extraction *in situ;* nor do I find anything on the subject in the published observations of the geologist of the expedition, M. Muishenkoff."

VI. *Passes between the Zarafshán and Oxus Basins.*

The Essay says (p. lix), "From about long. 68° to 69° the Fántágh seems to be singularly impenetrable. One pass leads southward into the province of Hissar by the lake called Iskander-Kúl (lake of Alexander), and the crest of this can be crossed only by pedestrians, so that travellers have to dispose of their horses before crossing, and to procure fresh animals on the other side. This is probably the pass called by Baber Sir-i-ták, which was traversed by him in 1500 . . . . . From Hissar he ascended a branch of the Hissar River called the Kam-rúd, descending by the lake through the Fán and Kshtút territories into Sogdiana; and he gives a most formidable description of the road, which must have been indeed a bad one to make such an impression on Baber, with all his experience."*

Note 30.—"The statement (about the impassibility of the range) is a mistake; evidently Colonel Yule's information was here defective. West of the Iskandar-Kúl we know of two passes near the sources of the river of Mághián, and called respectively Síbí-Surkh and Dugdán; whilst to the east of it General Abramoff's Expedition obtained information regarding several passes, one of which, leading by the sources of the Zíbi River, which flows through the province of Hissar, is described as a very easy one."

Note 31.—"The pass referred to (by the lake) is called by the natives Mura, and was explored in 1870. Its height was found to be upwards of 12,000 feet. The ascent is difficult; you have to walk in the snow until you come to the first ridge; then you cross a small glacier, which still pertains to the Zarafshán Basin; then you climb the second ridge, which forms the watershed between the Zarafshán and Oxus. On the path across the snow we saw a quantity of the footmarks and droppings of sheep. These are sent across in summer to the hill-pastures of the Zarafshán, and return in the autumn. Colonel Yule quotes me for the statement about horses being unable to cross; but since my visit to the pass I will no longer pledge myself that it is absolutely impracticable for horses, at least during certain months, when the state of the snow is favourable. Natives who have to traverse such passes generally prefer to go on foot because they have less trouble in difficult places. Thus, at the Alaï, they told me of a certain journey which required three days if on horseback, but only two days if on foot. The chiefs in the highlands of the Zarafshán

* Sir H. Rawlinson interprets Mas'údi as saying that the flames *extended over* 100 parasangs (*Journal R. G. S.*, xlii., p. 506).—*Y.*

† The French version made for me says: "*qui fut aperçue même de Tashkent;*" but as Tashkand is a good deal further north, I do not appreciate the force of the *même*. It was in the same month, and perhaps therefore the same night, that we saw the aurora at Palermo, to the great astonishment of the natives.—*Y.*

* Here is what Baber says: "In these roads, which are extremely dangerous, often overhanging precipices, and in the steep and narrow hill passes and straits which we were obliged to ascend, numbers of our horses and camels failed—and were unable to proceed. After four or five days' march we reached the mountain pass of Sir-e-Tâk. It is a pass, and such a pass! Never did I see one so narrow and steep; never were paths so narrow and precipitous traversed by me. We travelled on with incredible fatigue and difficulty amid dangerous narrows and tremendous gulfs. Having after a hundred sufferings and losses, at length surmounted these murderous, steep, and narrow defiles, we came down on the confines of Kân (read Fân). Among the mountains of Fân there is a large lake which may be about a *kos* in circumference, and is very beautiful" (*Leyden and Erskine*, p. 85). Pavet de Courteilles' version gives the passage more concisely, and calls the lake a *sher'i* in circuit. I do not know how much that is. Fedchenko says the lake is really about 10 versts (3½ miles) round.

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habitually employ foot-runners, not horsemen, to transmit their communications."

Notes 31, 32.—"There can be no doubt that this was the pass mentioned by Baber: his description agrees perfectly with what I saw in 1870. Our pass bore another title (Mura), but that of Seritag appears to survive in the name of a village now deserted by its inhabitants, because, as we were told, their wheat would not ripen (the height is about 8000 feet).

"Baber's route, however, coincided only in part with that of General Abramoff's party. Before reaching the lake,* near the ruins of Seritag, the traveller (by Baber's route) passes to the left bank of the river, and climbs the hill from which Baber beheld the lake; then, crossing the crest, descends to the river of Pora, and follows its course to Kshtút. The natives still make use of this road; and near the lake we fell in with some people of Panjkand, who had come that way in order to gather brushwood of sorts, which abounds in the vicinity of the lake."

Note 34.—"It is probable that those horrors of the path which Baber pictures are to be found on the southern side; indeed on the T'ian Shan generally† the northern acclivity is found to form a gradual slope, whilst that on the south is precipitous; a fact dependent on the geological structure. But, in spite of all the difficulties, Baber would seem to have got at least a part of his horses and camels across; he only says *some* were unable to pass. That camels should have got across at all is marvellous!"

VII. *The Iron Gates.*

At p. lx of the Essay reference is made to the once famous Pass of Kohlúgha, or the Iron Gate, which I supposed to be on a route not now generally used, and the descriptions of Hwen T'sang and Clavijo are quoted.

Note 42.—"The position of the place so celebrated under the name of the Iron Gate may, I think, be indicated with sufficient precision, although both Hwen T'sang and Clavijo assert that it is the only pass across the mountains which form the southern boundary of the valley of Shahr-sabz. I learned from Jura Beg‡ that there are three routes leading out of the valley besides the main road turning the flank of the mountains, which Colonel Yule mentions.

"The first of these lines runs along the Tenekhas and its tributary the Ulach, and then traverses the pass of Chapok; it debouches at Sar-i-júi, between Dehnáo and Básh-Hïssár ... The second line passes near Tash'kurghan and crosses the pass of Kaltamunár. The third, a long way to the west, after crossing the mountains, descends upon Baissun. Now, after attentively reading Hwen T'sang and Clavijo, I can find in no one of the three the famous Pass of the Iron-gates which they describe, but I do find it in the fourth road, which is now called the Arbia. Hwen T'sang's words about the mountains rising to a prodigious height on either side may seem opposed to this view, whilst Clavijo says only 'rise to a great height.' But other passages of both writers support my view (contrary to that of Colonel Yule§) that the actual Arbia route still passes by the former site of the Iron-gates. Thus Hwen T'sang travelled from Kesh [or Shahr-sabz] two days to the south-west, and not till the expiration of these two marches did he enter the mountains. And, in fact, *south-west* is the only possible direction in which one *could* travel two days on a level; on all the other routes from Kesh into the Province of Hissar the very first march carries you into the mountains. Now if you go south-west you cannot avoid falling into the road that I am speaking of. 'There was neither water nor any green thing,' says the Chinese; conditions not possible on the three first lines, which cross lofty mountains, but entirely in accordance with the description I have had of the Arbia road. And, lastly, the circumstance of the two hills rising (as described) on both sides, like walls of rock, between which only a narrow path is left, is only possible among inconsiderable hills rent asunder by longitudinal fissures. There is no such feature to be found in Central Asia or any of the lofty mountain passes.

"The fact that carts now traverse this road cannot be held to be a serious objection. For though Hwen T'sang speaks of the paths up the gorges running along the verge of precipices, Clavijo says the road, though very deep, is smooth, and that the ravine looks as if it had been artificially cut.

"Lastly, it is interesting to observe that to this day one of the stations on this road is called (as I have written it down) Kallug, and that the Iron-gates anciently bore the name of Kuhlug."

Our recent English maps are altogether useless on this question. A route leading from Kesh to Dehinao by the Iron-gate, under the name of Derbend or Kohlúgha appears in the older maps of this century, such as Macartney's map to Elphinstone's *Caubul* and Waddington's map to Erskine's *Baber*;* and in Col. Walker's map of 1868 we still find a route indicated by "Derbendi or Katunga" (the last a clerical error for Kahlúga). But in his last edition I see that, though Derbendi is left in isolation among the mountains, the route has been erased. The version of Fedchenko's map published in *Ocean Highways* of August last, just suffices to show in a vague way the line of road that he speaks of in the preceding note, leading from Guzar (Khozár of Erskine's *Baber*, p. xxxvi, Hisar of Walker 1868, Kuzar of Walker 1873) to Baissún. This part of the map in question, as already explained, does not correctly represent his views or information. I still hope that the revised map, alluded to in the remarks which introduce this paper, may be published; it would probably render this and other matters more intelligible.

VIII. *Mountains called Koh-i-tan or Kuhtan.*

At p. lxi of the Essay it is observed that Burnes applies the name Koh-i-tan to a branch of the mountain mass which divides the basins of the Zarafshán and the Oxus, running down into the latter, whilst Baber seems to apply Kotin or Koh-tan, apparently the same name, to the mass of mountains as a whole.

Note 44.—"To the Kohitan of Burnes and the Kuhten of Baber we must add the forms Kotin-Kuh and Kuyutin-Tau, which I find (to have been introduced) in my map of the Khanat of Kokan, as published by the Geographical Society (of St. Petersburg); and again the name Kohistán has been recently introduced by the members of the Iskander-Kúl Expedition. I fear that all these names will only lead to confusion, similar to that which has already been created by Sarikúl, Serikul, Sárigol, &c., and it would be well for geographers to avoid this. It is in

* *I.e.* from the south.—*Y.*

† Of which M. Fedchenko reckons these mountains to be the south-west extremity.—*Y.*

‡ The ex-chief of Shahr-sabz.

§ The road turning the mountains of which I spoke was that leading from the Oxus ferry at Kilif and Khoja Sálih, over steppe-land, to Karshi. This is certainly not the Arbi Road of which M. Fedchenko speaks. Perhaps this Arbia represents some word *'arabiah* from *'arabah*, implying "cart-road"? See further on.

* Kohlugha occurs in Baber, p. 29.

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the highest degree improbable that the mountains north of the Hissar road should be Kotin-Kuh, whilst those south of it are Kuyutin-Tau (*Kuh* and *Tau* alike signifying 'mountain,' one in Persian the other in Turki); and much more likely that both are corruptions of one name. It would be much better to keep to Baber's nomenclature, who probably used the name as he heard it generally used, and to apply the name Kuh-i-Ten to the whole of the mountainous region which embraces the higher part of the Zarafshán Basin, the sources of the Shahr-sabz Rivers, and the northern part of the Hissar territory, instead of the indefinite Kohistán, which merely means 'Highlands.'"

IX. *Termedh.*

Note 45.—". . . . . I have never heard Tarmíza (so it was pronounced) spoken of except as a ruin. There must, however, still be a ferry on the Oxus there. It is nearly midway in longitude between Balkh and Khulm."

If Termedh or Tarmez, that once famous city, is now a ruin, this accounts for what I have noted in the Essay, that we now hear nothing of it; and for its being entirely omitted in the map published under M. Fedchenko's name. In that map Shirab must be nearly on the site of Termedh.

X. *Province of Hissar.*

On this it was observed in the Essay that we now know no more than the late General Waddington, fifty-six years ago, could learn when compiling his map for Mr. Erskine's *Baber*.

Note 46.—"I can add but little from Russian sources. But this territory is to all appearance very rich and populous. On the Amír's victories over Sari-Khan, in 1869, the Bokhara people said to me, 'We have lost Mian-kal,* but God has given us in exchange the province of Hissar.' Along the southern slopes of the Kohistan there flow several small rivers whose waters are entirely exhausted in irrigation. Of larger rivers we are acquainted with only two; the Tufalan and the Kafirnihán. To the west of the Hissar territory are situated the important towns of Dehnao, Baïssún, Shírábád, Saidábád; to the east of it Doshamba and Faizábád; and in the mountains Kurghán Saushít (?), which was the centre of a small independent territory.

"Dehinao is the centre of a small province, distinct from Hissar, and subject to the Amir of Bokhara."

"I was told that the chief town of the province of Hissar was called Básh-Hissár; and Jura Beg informed me that it is quite as large as Uratupah. The southern portion of the province has all the character of a steppe; and in this quarter I know of only two inhabited places, Kurghán Tapah near the confluence of the Surkháb with the Oxus, and Kubádián, not far from that of the Kafirnihán, with the same river. Owing to the unshaded position of the town,‡ planted on a low hill, the heat is there in summer insupportable, and a peculiar disease is generated which they call Tabbat. After violent and hot winds people are attacked with fever; they drink water greedily; the abdomen swells; after several months or years of suffering death ensues. New comers are most liable, but natives are not exempt. Hence, during the summer months, May, June, and July, they go to the hills. At that season a new comer is sure to die, said Jura Beg.

"In the journey of Sidi 'Ali Kátib Rúmi, with which Colonel Yule seems to be unacquainted,* and to which my attention was called by M. Khanikoff, we have a very curious though short account of his passage through the province of Hissar. He traversed it on his way from Badakhshan to Shahr-sabz. Starting from Kshimes,† then the capital of Badakhshan, and passing by Doába and Zafar,‡ he arrived at Rusták, and then crossed the Amu-Darya. Turning eastward, he then entered the province of Khotl (now the Begship of Kuláb), and by Dilli reached Guláb (which we usually call Kuláb). Then, proceeding by Chársú, he came to a bridge; evidently over the Surkháb, and probably the same bridge that is mentioned further on (in the Essay) under the name of Pul-i-sangin," &c.

This last sentence must be due to some error in the German translation of Sidi 'Ali's narrative; for the French version in the *Journal Asiatique* says distinctly that "falling in with the River Pulisangin, we passed the bridge and dismissed our escort" (*J. As.*, 1st S. vol. ix., p. 205). This Pulisangin, or stone bridge, is a very interesting point, to which we shall recur presently.

XI. *Chaghánián.*

The Essay says (p. lxii): "This province (Hissar) in old times bore the name of Chaghánián—perhaps from some tribe of Mongol affinity, which found its way hither in the movements that led to the fall of the Bactrian monarchy;§ and under the Arabic form of Saghánián, it is famous in early Mussulman history and geography."

The term occurs in the narrative of Sidi 'Ali, which was cut short in transcribing the last note. On leaving the bridge he goes to Bazárand, Chihárshamba, and thence "to Chaganián, *i.e.*, to the Fortress of Shádmán."

Note 47.—"The Province of Hissar belonged anciently to the Government of Chaghánián, but, as M. Khanikoff observes to me, the boundaries of this state were much more extensive, and at a certain period even the districts on the left bank of the Amú-darya (Oxus), as far west as Andkhoï, belonged to it (see *Clavijo*, p. 115). It seems to me possible that the southern half of Karategin may have belonged to this state. For the people of Karategin say that anciently their country was termed Yagan (Djagan), and that it is spoken of in history under this name."

The last notice is interesting; but I must express great doubts about M. de Khanikoff's view as to Chaghánián having extended across the Oxus in the 15th century. It requires a great deal more learning than I have to prove a negative in such a case, but my impression is that the use of Chaghánián as a *territorial* appellation had then been long obsolete, and that it survived only as the name of a town or fortress in the province of Hissar. It occurs, as far as I can find, in Baber only on one occasion, and then in this sense (pp. 60, 61); the local adjective comes up oftener in the name of Baber's faithless comrade, Báki Chaghániáni. The passage in Clavijo referred to by M. Khanikoff, speaking of Anchoy (Andkhoï), says: "This city was beyond the land of Media, in a land called Tagiguinea, and the language of the people differed from the Persian." In *Marco Polo* (i., 144) I have expressed the belief that Tagiguinea was Juzgána, a region to which Andkhoï did certainly belong; but though I am not disposed to press that as more than a possible explanation of a difficult word, I cannot think Chaghánián is even so probable.

* Katte-Kurghán?—*Y.*

† This is taken from another note (48).

‡ I understand this to refer to Bash-Hissar; but it is not clear.

* No use is made of it in the Essay under comment, but I have quoted this curious history elsewhere; *e.g. Marco Polo*, ii., 2, and *J. R. As. Soc.*, N. S. vi., 278.—*Y.*

† Kishmis, for Kishm in Western Badakshan the Casem of Marco Polo.—*Y.*

‡ Kila 'Zafar, a famous fortress, often mentioned by Baber, and in the time of his immediate successors. It will be found in my map in the new edition of Wood. Rustál: is on the right bank of the Kokcha, below K. Zafar. *Y.*

§ Referring to the Mongol *Chaghán*, "white."

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A great deal of light is wanted both as to the past and present geography of this region, and the first glimmer that we have had comes (to me at least) from these notes of M. Fedchenko's.

Our notions hitherto—chiefly derived from Erskine, whose authority is generally excellent—have been that there was one ancient place called Chaghánián, probably the oldest capital of the region; a second, Hissár Shadmán, somewhat further west, which, in the middle ages, gave the name of Hissar to this province; and a third, Dehinao, which in latter times has been the capital of Hissar.

Now, however, according to Fedchenko, Dehinao is not in Hissar at all, but is the capital of a distinct small state, whilst the capital of Hissar is a place called Básh-Hissár, which may or may not be the Hissár Shadmán of the middle ages. Then again if Sidi 'Ali is to be taken literally, Hissár Shadmán was the same as Chaghánián. Yet in Baber Chaghánián and Hissár are quite distinct, though apparently within a long night's march of each other (see *Baber*, p. 61).

XII.—*Curious Error in Leyden and Erskine's "Baber."*

In gathering stray notices of the climate of the Oxus Basin, a passage in Baber was referred to (p. 131) which represented that wandering prince as taking his seat under the shade of a lofty palm-tree, in the territory of Doshi. This always puzzled me a little, as, even if there are date-trees in the Oxus Basin, Doshi must be a good many feet above the lower levels of that Basin. M. Fedchenko (or should I not here say M. Khanikoff?) observes—

Note 52.—"In the original of *Baber*, published by M. Ilminskikh, at Kazán, the reading is *úlugh chinár*, 'a big *chínár*' or *Platanus orientalis*. I can't guess whence the English translator took the word *palm-tree*. In the French translation of M. Pavet de Courteille, the word is correctly rendered *platane*."

Most probably it was only a printer's or transcriber's error; *palm* and *plane* are not very unlike.

XIII. *Pulisangin (The Stone Bridge.)*

Note 54 is long and discursive in quotation from, and comment upon, the extracts from Ibn Dasta on the Oxus which Sir Henry Rawlinson embodied in his address to the Royal Geographical Society in 1872. I do not translate this note, but I find incidentally mentioned in it that the Stone Bridge over the Surkháb was known to M. Fedchenko, by report, to exist at Narak; "Col. Yule also (he says) mentions the Stone Bridge, and he puts *Pulisangin, i.e.* Stone Bridge, where I put Narak."

It was very satisfactory to find that in my map I had located this famous bridge, from the data solely of old Oriental geographers, historians, and travellers, just where M. Fedchenko places it from recent native itineraries, and without *any* reference to the old authorities. Last year, before being aware from Fedchenko's note that the bridge existed at Norak, I had drawn Major Montgomerie's attention to the importance of fixing this bridge, should any of his *Pundits* travel that way.

If, indeed, reference be made to the map of last August, Narak or Norak will be found in quite a different place, viz., on the Kafirnihán River instead of the Surkháb. But this is not a position given by Fedchenko. He observes—

"On the map of the Khanat of Kokan, Narak has been placed on a river which, lower down, takes the name of Kafirnihán. I cannot tell how that has happened; but it is clearly impossible. There can be no Stone Bridge across such a river as that.

"On the map in question the water-courses are laid down differently from what they were in the original as furnished by me. I do not know the reason of these alterations, but I consider the altered map as far from correct; and in my new map I am laying down the rivers again as they were originally traced." *

In the altered map, Faizábád, which is placed one degree west of the Surkháb, should, I believe, be *near* that river; Norak should be *on* it; Dartkul and Kongurt should be *east* of it. Some of these places are found more correctly placed in Col. Walker's last map.

Further on, where the Essay quotes Istakhri's account of the Pul-i-sangin, M. Fedchenko says again, *Note* 72:—

"The natives, in their narratives, have also told me about this bridge, informing me that there was at Narak a bridge of stone thrown across the river (Surkháb). One of them, Mirza G. Kuna, even described it to me as a surprising sort of a bridge; he said that the river in this place is excessively narrow, and that the bridge abuts on overhanging rocks. However, though the Mirza did tell me that, it is probable that he was merely repeating what he had read in Istakhri."

But, indeed, I prefer to believe that the Mirza was speaking from his own knowledge of this venerable piece of engineering.

XIV. *The Surkháb or Great Northern Contributary to the Oxus.* (See *Essay*, 18).

Note 55.—"Particulars regarding the branches of the Surkháb will be given in the fifth chapter of my journey in the Khanate of Kokan.

"Here I will only say that the Surkháb is formed by several rivers rising in the mountains which enclose the Alaï on the north and south, and that the river which flows eastward probably passes through the Kizilart defile leading to the lake Karakúl. This pass is about 60 versts (40 miles) east of the sanctuary called Kokan Kurghán at Alaï. Swollen by numerous tributaries, the Surkháb has already, at the point where it leaves the Alaï Steppe, the aspect of a considerable body of water. The lowest ford is opposite the sanctuary, and that is found only because the river there is divided into several branches. Lower down, bridges have been established.

"Still further down, and within the Karategin boundary, the Kizil-Sú after uniting with the Múk-Sú receives the contribution of several streams, viz., the Zanku-Sú (or Lai-Sú), the Yarkush, the Gorif, with its affluent the Sangikan, and the Khujankharf.* All these streams come in on the right. Col. Yule's map inserts affluents from the left, under the names of Kaliaï and Ab-i-shor. The first evidently is meant for the Yarkush, for opposite the confluence of that stream, on the left bank of the Surkháb, there is a tomb called Kaleï-Lab-i-áb (Lab-i-áb, signifying 'river bank').† Ab-i-shor is probably a very small stream, which in Abramoff's report is noticed as entering the Surkháb from the left.‡ But, except the Múk, I have heard only one river mentioned as entering it on the left within the Karategin territory, viz., the Khullyas. I do not know its position with any clearness. Muzafar Shah, ex-prince of Karategin, told me it was near Yustyu-yakhák (?); but V. R. Sieroff, Governor of Samarkand, to whom I owe most active assistance, has informed me that the Khullyas flows through Darwáz. As the province of Wakhia, which lies immediately south of Karategin, is subject to Darwaz, I imagine that this river traverses the valley of Wakhia. Whether it is so or not

* Note 72.

* In the Map, of *Ocean Highways*, August 1873, this is called Mujikharf.—*Y.*

† The Kalyai was simply derived from Gen. Abramoff's Report, as translated by Mr. R. Michell, where it appears as on the left. (See *J. R. G. S.*, vol. xli, p. 340.)—*Y.*

‡ This was also derived from the same report.—*Ibid.*

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is one of the questions awaiting solution when these mysterious regions shall be explored. It is possible that in Wakhia it receives the name of Wakhsh, and is called Khullyas further down. At a still lower point the Surkháb must receive the Khowalin, which rises in the province of Kuláb.*

"So much was I able to learn about the general course of the Surkháb and its tributaries. Incomplete as these data are, they enable us to lay down the general form of the basin of this northern affluent of the Oxus: and they establish beyond all question that the Surkháb is a great river, in its length of course and copious discharge little inferior to the Panjá itself."

M. Fedchenko, among his many services to geography, has restored to our knowledge this valley or province of Wakhia, which there can, I think, be no doubt is the anciently famous province of Waksh, the name of which is probably intimately connected with that of the great river itself, the Oxus.

Elphinstone indeed had heard of Wakhia as a province in connection with Darwaz,† but in the last edition of his great work, probably from finding Wakhán only, and not Wakhia, mentioned by Burnes, he seems to have accepted the view that Wakhán, Wakhia, and Waksh were all the same territory. Macartney certainly was aware that they were not the same, as he distinctly connects the Panjá with Wakhán, and knew the Wakhia River as a tributary of the Surkháb or Karategin River.‡ "This river," he says, "receives many streams in its course, besides the Suffeekun and Wukheeha Rivers." I cannot tell what river he called the Safikan, but I have not the slightest doubt that this excellent geographer had good reason for using the name, and that it will be found before long. Perhaps it may be that of which we are about to speak.

The Khovalín of Fedchenko is represented by him as running by Baljiwán in Kuláb, and I have a strong impression that the town called Khwáling in Colonel Walker's, and in some earlier maps,§ is really the ame as Baljiwán. Baljiwán we see, according to Fedchenko, is on the Khwaling River; whilst its place closely corresponds to that assigned to the town Khwaling in Abdul Mejid's itinerary; and none of the few routes or route-maps that we have of that region mention both.‖

XV. *Karategin.*

Note 57.—"The roads along the Surkháb must certainly be difficult, but it is not correct to say that they are only passable on foot. On both sides of the river from Dombraz ¶ to Garm there are roads passable for horses. These roads are difficult, no doubt, because at some points the traveller has to cross what are called by the natives *Kíya*, certain *mauvais pas*, where the road shrinks to a narrow path along the rocky and precipitous flank of a mountain overhanging the river. Several of these *Kíya* cannot be crossed at night; and probably when there is ice upon the path the passage of horses becomes impracticable. But one must not believe what has been stated about its being necessary always to traverse these passes on foot, and even by crawling with feet and hands.**

Note 59.—"The Galchas, as has been shown by recent Russian researches, are not a separate race, but merely hill Tájiks, who speak Persian with some provincial peculiarities. Galcha means something like 'poor wretch,'* and is a name that has been bestowed on them by their Tájik brethren who occupy richer territories."

Note 60.—"The prince of the country bears the title *Shá*, evidently the same word as the Persian *Sháh*."

Note 62.—"The upper waters of the minor rivers, and even the Surkháb itself, from Pildán upwards, are exclusively occupied by Kirghiz, a small number of whom live in villages (especially in winter), whilst the rest lead the life of nomads."

Note 64.—"Muzafar Shah informed me that Karategin was anciently called Yagan, and that it is mentioned under this name in the works called the *Tarikh-i-Guzídah* of Hamdalla Mustaufi (14th century) and the *Rawzat us-Safá* of Mirkhond. I do not know if this is to be depended on, but one is struck by the resemblance between this name of Yagan and that of the district of Yagnáu or Yagnáb which is one of the affluents of the Zarafshan and immediately adjoins Karategin. I have before alluded (Note 4) to the resemblance between Yagan (Jagan) and Chaghánián."

From Baber we learn incidentally that a route between Hissár and Ferghana lay through Karategin, probably the same that was travelled by Abdul Mejid on his return from Kokan in 1861.

Note 65.—"There are several such routes; I myself know four passes across the watershed—Tarak,† Aláuddin, Karakazuk, Isfaïram. The last leads by Alaï, but it is made use of as the easiest. It was by this road that Abdul Mejid returned, and also that I visited Alaï. Moreover several lines lead to the Tarak Pass up different glens. The Tarak route is a very difficult one, but has the advantage of being the shortest. By this line the distance between Kokan and Garm in Karategin is scarcely more than 200 versts (133 miles); but it requires at least five days to do it."

Note 66.—"According to Muzafar Shah (the ex-prince), Karategin and Darwaz formerly constituted but one state. After the death of a certain ruler, this was divided between his two sons. Hence, several of the later sovereigns of Karategin made efforts to subdue Darwaz, and in return some princes of Darwaz succeeded in conquering Karategin. In the list of sovereigns of Karategin which Muzafar gave me, I find two called Sháh-i-Darwaz. At the time of the Kokandian invasion, under Mahomed Ali Khan, Karategin was subject to Darwaz, so that the Kokandians had to deal with three brothers, one of whom lived at Khaika, a village near Sokau in Karategin, a second at Garm, and the third at Darwaz."

Note 67.—"At present Karategin is governed by Rahím-Shá, surnamed *Puckuk*, 'cock-nose.'‡ This is a nephew of Muzafar Shá, who dethroned the latter, and I shall tell the story, which is rather complicated, in my book. Muzafar Shá claims direct descent from the line that held Karategin before the division of the territory."

Note 68.—"There can be no doubt that there was a regular campaign of the Kokandian troops, which ended in the conquest of Darwaz and Karategin.

* In another note (69) M. Fedchenko says, "Wakhia is separated from Karategin by mountains with difficult passes; it is watered by a large river, and it has numerous villages, fine gardens, and the sanctuaries of Chibldara, and Tavildara."

† "Wukheeha," as he writes (see *Caubul*, ed. 1839, i., 118; ii., 387).

‡ *Ibid.* ii., 409, 411.

§ *e.g.*, a map of General Monteith's in the R. G. S. map-room, of which I have a tracing. It there appears as Howalin.

‖ Both were introduced in my map of the Upper Oxus; but the conclusion in the text has since then been arrived at.—*Y.*

¶ Dombraz, on M. Fedchenko's map, is at the confluence of the Múk, and the Surkháb, at the very head of Karategin.

** See *J. R. G. S.*, xli., p. 339.

* Presumably Ghalchah, "a villager, a rustic."—*Y.*

† See August number of *Ocean Highways*, 1873, for map. Not to be confounded with the Terek Daban between Kashgar and Andiján.—*Y.*

‡ The word *Pitchúgh* in Pavet de Courteille's Dictionary is explained "defiguré par une blessure au nez."—*Y.*

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The indigenous rulers were maintained in authority, but acknowledged themselves vassals of Kokan. I have heard the story of the campaign from those who took part in it, who for the most part were not Kirghizes. Darwaz seems to have been the first to renounce obedience to Kokan. The Prince of Karategin acknowledged vassalship up to 1869, when in consequence of the incursions of Sari-Khan, he took refuge in Kokan. Colonel Yule is in error in doubting the reality of the conquest; an English agent, Abdul Mejid, sent to Kokan in 1861, says that Karategin and Darwaz are 'both tributary to Kokan.'"*

XVI. *Confluence of Surkháb and Panja.*

(On a passage in my essay—§. 18—pointing out that we must go back to Macartney for the true position of this confluence, near a place called Kurghan Tapah; all the later maps having misrepresented it).

Note 73.—"I also fell into this mistake when preparing the map of the Khanate of Kokan; but I entirely agree with Colonel Yule that the confluence of the Surkháb is much further north. Several natives assured me also that Kurghan Tépé was near the confluence."

XVII. *The term Sad, for a district.*

Essay p. lxxiv says that Wakhán is divided into four districts, called *Sads* (Hundreds?†):

Note 77.—"I do not know the derivation of the term, but *Sad* is used apparently to designate groups of settlers among all the hill Tájiks. In the valley of the Zarafshán the different districts of Mácha such as Falgar, &c., are termed *Sad*."

XVIII. *Extent of Authority of Badakhshan, &c.*

Note 79.—"Do Roshan and Shugnan,‡ especially the latter, acknowledge the sovereignty of Badakhshan? We have no trustworthy evidence of the fact, and it appears to me doubtful. Perhaps they may have exchanged presents, but that is not in Central Asia a test of dependence. A small power may send presents, and the greater one may of course represent these to his courtiers and to the nation as *tribute*. We know how the Chinese in this fashion came to reckon nearly all Asia as tributary. But Colonel Yule himself has not on such a ground admitted Badakhshan to have been subject to China; and, on the other hand, how long is it since the princes of Balkh ceased to send presents to the Amír of Bokhara?"

And again on my statement of the provinces, sixteen in number, recognized as forming Badakhshan and its dependencies, M. Fedchenko writes:—

Note 84.—"Who so recognizes them? But whencesoever they come, these notices regarding the political state of things are of very doubtful accuracy. I have before observed that the subjection of Shugnan to Badakhshan was more than problematic; and I may add that in regard to Wakhan,* the information collected by the Russians have also shown that it also is free from all dependence, unless we consider as a sign of subjection the transmission of presents to the Amír; and this is rather a matter of exchange, since the latter makes presents in return. Another thing that makes us doubt the accuracy of Colonel Yule's information as to the political constitution which he attributes to Badakhshan is, that with divisions so constituted it would form the most solid political unit in Central Asia; and yet there is no occasion recorded on which the sovereign of Badakhshan has ever made a figure at all."

The statements in detail as to the provinces recognising the superiority of Badakhshan were derived from Pandit Manphul's report, which, brief as it is, is the best information we yet have on Badakhshan. And, as it was penned in 1867, I apprehend that it is entirely unbiassed by any forecast of political questions such as are now mixed up with the boundaries of Badakhshan, and such as underlie my commentator's last remarks, and being facts stated on this, the best accessible authority, without any facts on the other side, they were so recorded. Manphul's statement, as I understand it, represents the *normal* view of things. Whether in any given year the chief of any given province between Peshawar and Samarkand was or was not in rebellion against his liege lord is quite another matter; generally it might be assumed that he was likely to be so. No one ever supposed that the vague understandings of such a bond would be systematically carried out; the strength of the so-called "constitution," which is no phrase used by me, and the degree of unity in the body for action, must depend entirely on the strength for the time of the central authority. The country, it must be remembered, is very small, and the natural divisions difficult.

Of the theoretical recognition of the supremacy of Badakhshan we have old traces. Marco Polo is very precise about the vassalship of the chief of Wakhan to the Lord of Badakhshan; Shighnan he reckons simply as a part of Badakhshan. In the disputes between Kashgar and Badakhshan in Baber's time, both Wakhan and Darwaz claimed the protection of the Khan Mirza, then ruler of Badakhshan, as belonging of right to that country.† In the Chinese accounts of their invasion of Badakhshan last century, we see that they made against the Mír Sultan Sháh a demand for the extradition of the two fugitive Khojas of Kashgar, who "*s'étaient cachés à* Siknan, *situé dans le pays de Badakhchán.*"‡

XIX. *Localities of Salt Mines.*

Note 82.—"The localities in the Basin of the Oxus where I know of mines of rock-salt are (1) at Altinin Dara on the South of Alaï; (2) near Norak on the Surkháb; and (3) in the mountains near Huzar (or Guzar).§ The latter supplies all the Zarafshán country, and is known at Samarkand as Karshi salt."

XX. *Navigation of the Oxus.*

The Essay says, p. lxxxii: "The river is well suited to navigation, and was largely navigated in ancient times."

Note 85.—"Where did the author find his authority for the extent of navigation in ancient times? We have no knowledge of such a fact, and, on the contrary, all the facts lead us to the conclusion that it never was navigated to any continuous extent. On their expeditions Asiatic conquerors have crossed in boats at the most favourable points. This was done by Nadir Shah, but during Timour's wars a bridge was established. This broke after the passage of the troops, and the communication was re-established by boats."

* I had overlooked this, though quoting Pandit Manphul, as to the subjugation of the two states by Muhammad Ali Khan; and the doubt expressed was based simply on the words of General Abramoff, which declare Karategin to be entirely independent.—(See *J. R. G. S.*, xli., 338.)

† As *Sad* in Persian = 100, the use of *Sad* for a district may have originated in a manner analogous to that of the old English *hundred*, whatever that may have been.

‡ The Russians write *Shugnan*, and in French *Chongnan*; our authorities seem divided between *Shaghnán* and *Shighnán*. —*Y.*

* M. Fedchenko writes Vokhan.

† Erskine's *Baber and Humáyún*, i., 340.

‡ Klaproth, *Mag. Asiatique*, i., 91.

§ South-west of Shahr-sabz.

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The authorities for my incidental statement are *Strabo* (xi., 7.3) and *Pliny* (vi., 20), who both speak of the commercial navigation of the Oxus. The expressions are quoted in *Wilson's Ariana*, p. 143, which I refer to as having it at hand.

XXI.—*Ferries on the Oxus.*

Note 86.—"There is a considerable number of these. The greatest number are between the meridians of Khulm and Karshi, which probably indicates that the most important commercial lines lie within those limits. The names of these ferries, from east to west, are as follows:—Termed (this ferry seems also to be called Shiráb);* Búsrobar; Chushka Guzar; Kilif; Khoja Salih; and further down are the famous ferries of Kerki and Charjúi. In the official memorandum of the Russian *chancellerié*, which was printed in the *Times*, Chushka Guzar, is spoken of as opposite to Khoja Salih; but that is impossible: all our information assures us that Khoja Salih is about 100 versts below Chushka Guzar.

"I have been assured that Hazrat Imam, a district on the left bank of the Oxus is under the Amír (of Bokhara). Colonel Yule says nothing of this."

I certainly never heard of such a thing, nor of any fact that could have given rise to such a statement. The only incursion across the Oxus from the Bokhara side that I can find any notice of is the burning of Yangkila' in Badakhshan by the ex-Mír Jahandár Sháh, in the end of 1869.†

XXII. *Conclusion.*

M. Fedchenko, after referring to the Mirza's indications of more than one stream flowing from the lake of Little Pamir or its immediate vicinity, and to some doubts expressed near the end of my Essay, proceeds, with the candour and generosity characteristic of the man:

"Altogether I have had to regret my want of previous acquaintance with what had been written on that region, and my not having set out with all the knowledge already acquired by other explorers. This would have given a more precise direction to the questions which I put to natives, and would have enabled me to concentrate my attention more specially on points still dark and confused. But, in fact, the greatest part of the explorations which have thrown so much light upon the configuration of the southern portion of this region, have only been published since my own journey, or in any case had not before my journey got to Tashkend (such as the accounts of Hayward, Shaw, the Mirza, the Havildar, Faiz Bakhsh). Other sources of information were in great part inaccessible to me, either because written in non-European languages, or because found in rare works, which I have only of late had the power to consult. The present author's sketch is particularly important, both because it enables us to see whereabouts we stand when about to commence actual research, and because it calls our attention incidentally to a variety of complementary questions, or points in express terms to the principal blanks which remain. In the science of Western Europe there exists a very useful custom of resuming and estimating from time to time all that has been acquired up to that point, and by this very *resumé* a stimulus is given to push on the boundaries of knowledge and to fill up its blanks. This would be a good practice for us in Russia to adopt. It certainly must require some resolution to undertake a task with the full sense that it cannot be carried to a satisfactory completion; and our author himself in several parts of his sketch acknowledges how many essential data have still been lacking. In my opinion, that does him more credit than if he had hitched his personal ambition higher, and had waited for the filling up of the most essential gaps; in that case we should have had to wait some years longer for such a sketch.

"Now we see clearly what the blanks in our knowledge are. There remains a tract (of obscurity) extending between 67° and 75° of E. longitude (from Greenwich), with a width of about 2° of latitude in the east, and a little less in the west; it includes the western borders of Alti-Shahr,* Shugnan, Darwaz, Kuláb, Karategin and Hissar. The deepest obscurity is that which hangs over Darwaz and Shugnan; and it is quite possible that actual exploration of these countries will completely alter the contours assigned to them, whether by Col. Yule in his map, or by me in my map of the Khanate of Kokan. It is in view of this uncertainty that I leave the courses of the rivers as drawn by Col. Yule, for I recognize these to be quite as likely as my own. As regards the tracts about Karategin, Hissar, &c., on which I have had more trustworthy sources of knowledge, I have corrected the delineation according to the information I possessed.†

"My actual additions to the Essay have become somewhat lengthy, but I preferred to attach them to it as notes; and, finding that Madame Fedchenko was disposed to translate the Essay, I gave up the idea of giving a general sketch of the Oxus sources—an idea which I had taken up at Tashkend in 1870, and in the execution of which I then wrote several sheets. On making acquaintance with Col. Yule's sketch, I put aside my own commencement, and it seems to me that we do better in presenting the Russian public with the translation of the English work, accompanied by my own supplementary remarks, whilst at the same time we pay a merited compliment to the writer, to whom belongs the honour of having elucidated a number of obscure points in the geography of the Upper Oxus.

"I have by no means introduced in my supplementary remarks all the information collected regarding the upper basin of the Oxus, but I intend to detail it in a special chapter of my *Journey in the Khanate of Kokan* now being prepared for the press. It touches for the most part on Karategin, and in a less degree on Hissar, Kuláb, Darwaz, and Shugnán.

"In conclusion, it is an agreeable duty to mention the important part taken in the translation and notes by M. Khanikoff, who knows Asia so well, both by books and by personal experience. In addition to the fact that his name might justly have been attached to several of the notes, a number of my own remarks have benefited by the essential improvements and additions which he has supplied."

H. YULE.

* Shirab only appears on M. Fedchenko's Kokan map.—*Y.*

† See the *Parl. Correspondence*, Central Asia, No. 2 (1873), pp. 32-34.

* "The Six Cities," formerly the usual name of Kashgaria, and adopted by the Russians.

† This refers again to the revised map formerly alluded to, and still so much desired.

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THE RUSSIAN PROVINCE OF AMU DARIA.

IN the second section of the treaty between Russia and Khiva it is stated that the Amu-Daria will form the boundary between the territories of Russia and Khiva, from Kukertli to the point at which the westernmost channel leaves the main river; from this place the line of frontier will follow the western branch of the river to the Aral Sea, and will then be drawn along the shore of that sea to Cape Urgu, beyond which it will pass at the foot of the southern chink of the Ust-Urt along the so-called old bed of the Oxus.

Soon after the conclusion of the treaty, the newly acquired territory was formed into the Province of Amu-Daria, the inner boundary of which will be defined in accordance with a mutual understanding between the governor of the new province and the military governor of the province of Syr-Daria.

The newly incorporated territory includes the former Kizil-Kum region to the sands bordering the Bukan Hills on the north and the Ak-tau Hills on the east. The province is divided into the Shurakhan and Chimbai districts. The Kizil-Kum region having recently been described by A. P. Fedchenko and Horshikin, the following remarks will refer only to that portion of the Khanat of Khiva which has been annexed by Russia.

The new territory includes the whole delta of the Amu-Daria from its westernmost channel flowing into the Aral Sea and the littoral of the right bank to Kukertli.

The river separates into a number of channels at its delta, which, before joining the Aral Sea, form innumerable islets, lakes, and lagoons. Most of these low-lying islands are inundated during the spring floods; they are thickly covered with reeds, interspersed with an occasional clump of juniper, willow, and other trees.

From the eastern shore of the Aral Sea and the banks of the delta, the newly acquired territory is a broad, fertile tract of land as far as the grove of Tugai-Chatli, on the same meridian as the Laudan channel; beyond this, along the northern shore of the same Tugai, lies the sandy desert of Kizil-Kum, which, farther to the eastward, narrows the fertile land as it approaches the river. From Tugai-Chatli the country undulates, and towards the east is hilly, throwing out detached cones of inconsiderable height near the river. Such are the Koshkana-tau on the extreme west, the Bish-Tepeh (5 hills), and the Chilpik opposite the Laudan channel and higher up the river, opposite the towns of Hurlen, Kipchak, and Mangit, the chain of the Sheikh-Jeli Hills and the Sultan Oveis, the former rising abruptly above the river, and the latter situated at a distance of only 20 versts from it, towards the north-east.

Nearer Shurakhan the Sultan Oveis Hills diminish in size, and at length sink in the sandy steppes of the Kizil-Kum which continue along the right hilly bank of the river from Ak-kamish to Fort Usta, in the Khanat of Bokhara, opposite Charjui. In places these sandy elevations recede to a short distance from the river, leaving promontories of low land which are covered with grass, and are mostly inundated during the floods. The inhabitants call these little promontories *Tugai:* the wild poplar is sometimes found on them. The most important of these Tugais along the right bank of the Amu-Daria, from Fort Nukus to Meshekli, are Tugai-Chatli, Tugai-Jan Ghazi-khan, Tugai-Bish-Tepeh, Kipchak, Rahman Verdy Bey-bazar, Ak-kamish, Kukertli, Bazirgan-Tugai, Zangi-koigan and Meshekli.

There are no small rivers in the province of Amu-Daria. Below Meshekli the river divides into several channels, called Uziaks; the most important of which are Ak-kamish-uziak 40 versts from Shurakhan, Shiman-uziak near Shah-Abbas-Wali, Kok-uziak at Jan Ghazi-khan, Shurkhe or Kiz-Ketkian at Tugai-Chatli, Kuwan Jarma, Kuk-uziak near Fort Nukus, Kara-Baila and Kizim-uziak 20 versts from Chimbai.

Some of these channels form lakes; thus Kok-uziak forms lake Arik-Balik. A small channel near the Sheikh Jeli Hills forms lake Khoja-kul. To these must be added the salt lake of Sultan Sarai, 15 versts from Tugai-Chatli, whence the inhabitants obtain their supply of salt.

Besides the natural channels we have named, there are several large canals for irrigating purposes, viz., the Shurakhan-yab, the Buz-yab, the Uighur-yab, the Naiman-yab and the Khoja-yab, all communicating with the Amu-Daria, and supplying the smaller dykes and aqueducts, by means of which the water is brought to the fields and cottages of the inhabitants. The population of the province of Amu-Daria is partly settled and partly nomad, and in its present tribal divisions has probably occupied the country since the 15th and 16th centuries, except at Shah-Abbas-Wali, where the inhabitants are of more ancient extraction. We are of course referring to the present population of the country, without denying its having been inhabited at a more remote period. It is difficult to say exactly at what time the nomad population first appeared on the right bank of the river, because, according to local traditions, they frequently migrated from one bank to the other. However that may have been, the present inhabitants on the right bank of the river are a young race, and no traces of the aborigines remain. Half the nomad population leads a partially settled life; both nomads and semi-nomads cultivate the soil and rear cattle—chiefly sheep. They are mostly Uzbegs, Kirghizes, Karakalpaks, besides a few Turkmen and Persians; the latter are liberated slaves, some of whom obtained their freedom before the arrival of the Russians, while others were recently set at liberty and settled on the estates of their former masters. According to their own version they number from 3000 to 5000. The Uzbegs belong to different tribes who migrated from the left bank, not having any land of their own there; they inhabit the towns and surrounding huts;* they are agriculturists and gardeners, and number, according to their own account, 6000 houses.

The Kirghizes are estimated at 12,000 to 15,000 kibitkas, and belong to five different tribes. The Karakalpaks also belong to five tribes, and are reckoned at 18,000 to 25,000 kibitkas. The Turkmen number from 1500 to 2000 kibitkas, and belong to the tribes of Arbatchi and Ata. The Karakalpaks are

* There are no villages in this country as there are in Russian Turkistan—the inhabitants live in detached huts surrounded by their fields: the continuous population is only found in the towns.

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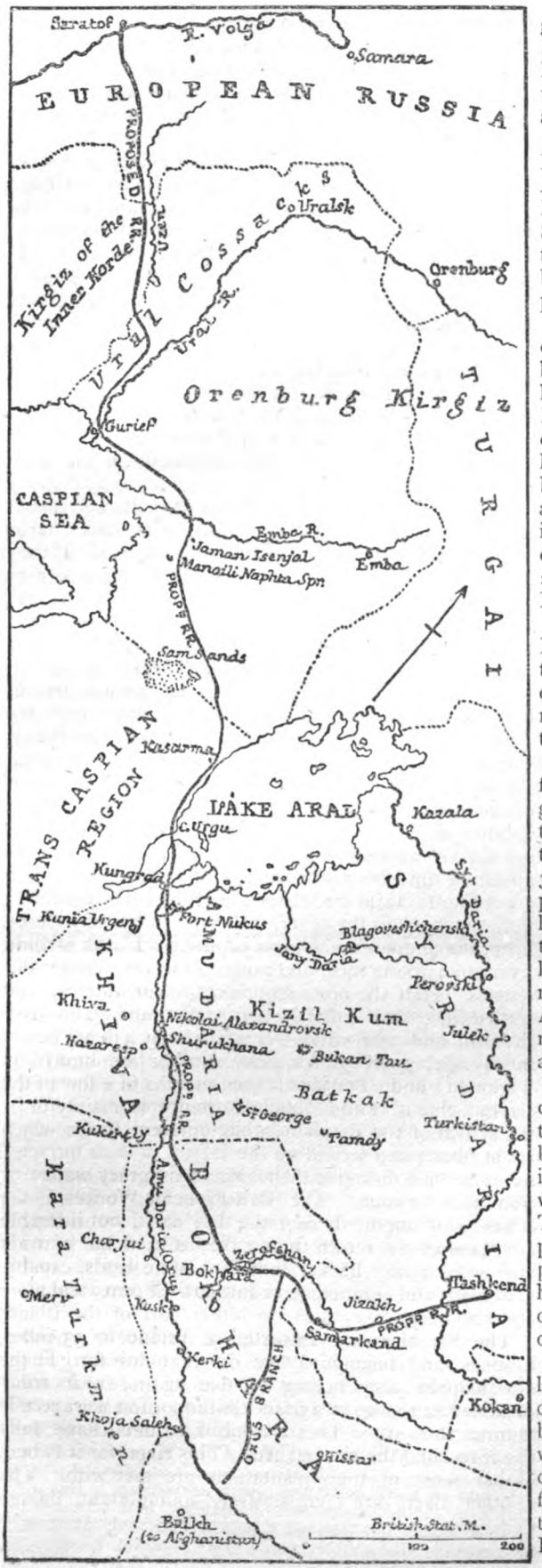

grouped between Chimbai and the delta of the Amu-Daria. To the north of them, near the Daukarin lakes, are the Kirghiz nomads, who may also be met with at Tugai-Chatli, Jan Ghazi-khan, Khoja-Kul, and at the foot of the Sultan Oveis Mountains.

The Uzbegs inhabit Nakus and Rahman Verdy Bey-bazar and their environs; the Turkmen of the Arbatchi tribe are in the vicinity of the Sultan Oveis Mountains; and the Ata tribe in the district of Shurakhan. We have endeavoured to indicate the chief centres of the different tribes, but it must be understood that they are also met with in other places.

The settled population reside chiefly in the towns of Shurakhan, Shah-Abbas-Wali, Rahman Verdy Bey-bazar, Nukus and Chimbai, and the forts of Jan Ghazy-khan, and Tugai-Chatli, occupied by the semi-nomad Kirghizes. Each of the above places, which may be called towns, is the central market for its surrounding huts. The population of the annexed territory may be roughly estimated at 6000 houses of settled inhabitants, and 37,000 kibitkas of nomads and semi-nomads; in all 43,000 houses and kibitkas, or, taking the usual estimate of five persons per house and kibitka, 215,000 persons, to which must be added 5000 Persians, making a total of 220,000.

As most of the land on the right bank of the Amu-Daria was considered to be the hereditary property of the relatives of the Khan, it was placed under the control of the Divan-begs (governors) or landlords; the nomad population lived on the Khan's land, and each tribe was ruled by its own elder.

Both the hereditary and Khan's land were rented for a payment in kind of the produce of the fields and gardens. The khans of Khiva levied the following taxes:—1. A ziaket on caravans coming from and going to Russia; 2. For the right of trading in the bazaars; 3. A money tax on land, a stipulated part of the produce, a ziaket on cattle, and a tax on all lands leased. The owners of hereditary estates paid no tax to the khans, but exacted payment from all those living on the land. No estimate can be made of the revenue derived by the Khan from the right bank of Amu-Daria, because the only data which we have refer to the income of the whole khanat, and not of any one part.

In attempting to estimate approximately the revenue of the newly annexed territory, we may take as a guide the tax actually levied in Turkistan, viz., 3 roubles per kibitka of nomads, and the payment made by the settled inhabitants prior to the annexation of the right bank, which was proportionate to the extent of their land. Thus the tax on the 37,000 kibitkas of nomads would produce 111,000 roubles, and that on the settled population at a tilla (3 roubles 60 copecks) per house, 21,800 roubles, which, combined with all other taxes, would produce a total annual income of 200,000 roubles (28,000*l.*).

The natural wealth of the new territory consists in land suitable for agricultural purposes: the most fertile districts are those of Shurakhan, Rahman Verdy Bey-bazar and Chimbai. The staple produce is corn, which is grown in sufficient quantities to supply some of the markets on the left bank of the river, and also for export to Kagalinsk in Turkistan. It is said that there are copper and silver mines in the Sheikh Jili Hills, and that during the reign of Muhammad Emin

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Khan the ore was smelted, but that owing to a want of skilled labour, the works were closed.

The importance of the right bank of the Amu-Daria in a commercial sense was not great; it served rather as a highway for the caravans from Russian Turkistan, Kokand, and Bokhara, to the chief central markets of the khanat on the left bank of the river. The caravans directed to Khiva crossed the Amu-Daria at Shurakhan, Shah-Abbas-Wali, Rahman Verdy and Nukus; all the caravan routes to the neighbouring countries passed through one or other of these towns; the river way was only used for the trade with Bokhara for a very short period of the year, as it was rendered unsafe by Turkman pirates, and the communication up stream was slow.

In concluding this short sketch of the new province, we should remark that formerly the right bank of the Amu-Daria was not an important part of the Khanat of Khiva owing to its scanty population. The chief centre of the river district was on the left bank, where the principal markets were situated. With the annexation by the Russians of the right bank, a new era of prosperity is anticipated, as the security offered to life and property under Russian rule will attract the trade and develop the resources of the Russian province.

E. DELMAR MORGAN, F.R.G.S.

THE VITI OR FIJI ISLANDS.

IN the Southern Pacific Ocean, between latitudes 15° 30′ and 19° 30′ S., at about 1900 miles to the north-east of Sydney, and 1200 to the north of Auckland, in New Zealand, and nearly on the direct track from Panama to New South Wales, there lies an archipelago of some 312 islands and islets, which has repeatedly come before the public of late years in connection with its incorporation into the British Empire. Viti, or Fiji, as it is called by the neighbouring Tongo islanders, was discovered, in 1646, by Abel Tasman, the great Dutch navigator. It was visited subsequently on many occasions; but for our knowledge concerning the geography of the islands we are indebted principally to the American exploring expedition under Wilkes (1830-42), and to Captain Denham and his officers (1857). Viti has been notorious in former times for the cannibalism of its inhabitants—a habit accounted for by a cynic through the absence of domestic animals, and to which King Thakambau himself, whose X (his mark) has of late figured on so many documents, was formerly addicted. Up to the year 1854 some of the native chiefs kept regular human breeding establishments, and the ovens at Ban were scarcely ever allowed to get cold. But the spirit of Christianity represented there, devoutly if not at all times judiciously, by Wesleyan missionaries, has greatly abated this evil; and cannibalism now flourishes only in the more inaccessible portions of the interior of the islands.

Before we proceed to lay before our readers a succinct history of the events which have led to an offer to Great Britain on the part of the native chiefs to assume the sovereignty over Viti, we would make a few remarks on its geography. The Archipelago of Viti consists, as we have stated above, of about 312 islands, having a total area of 8034 square miles,* which is almost equal to that of Wales. The largest island of the group, Viti-levu, or Big Viti, has an area of 4479 square miles; Vanua-levu, or "Big Land," has an area of 2486 square miles; Taviuna of 214 square miles; Kandavu of 207 square miles; and all the other islands together of 648 square miles.

All these islands are coral-girt, and to the navigator approaching them they appear to be clothed to their very summits with a dense and luxuriant vegetation. All the larger islands are mountainous, the mountains, in the case of Viti-levu, attaining an elevation of 4000 feet. They are of volcanic origin, and although there are no longer any active volcanoes, the existence of old craters and hot springs, the occasional occurrence of earthquakes, and the masses of pumice and ashes found floating occasionally on the sea in their vicinity, all testify that the subterranean forces are not yet quite extinct. There are but few level spots except at the mouths of the larger rivers. The greater part of the surface is undulating or hilly, and the soil, which in many parts consists of a dark red clay or decomposed volcanic rock, thanks to abundant rains, is exceedingly productive. Hardly an acre of land is to be met with that might not be cultivated or converted into pasture. A great difference exists, however, between the windward and leeward sides of the islands, the former enjoying more continuous rains. Dense and extensive forests extend up to the summits of the mountains, and no sooner is a plot abandoned by its cultivator, than the forest reasserts its sovereign sway. But immediately on crossing the mountain range which intercepts the rains, to the leeward side of an island, the aspect of the country changes. We see before us a grassy country, here and there dotted with screw pines. The rivers, however, as they flow outwards to the sea, fertilize the valleys through which they pass. The general physiognomy of the flora is decidedly tropical, that character being imparted to it by tree ferns, branching grasses, palms, scitamineous plants, orchids, and pepperworts. There are, however, entire districts, where acacias, casuarinas, metrosideros, and various creepers recall the flora of Australia. The coast-line of most of the islands is enriched by a dense belt of cocoa-nut plants. Mangrove swamps are limited in extent, and are confined to the mouths of a few of the larger rivers, and to this circumstance is mainly to be ascribed the freedom from intermittent fevers which the islands enjoy.

Amongst the rivers the Wailevu (great water) or river of Rewa, called Peale's River by Wockes, is the most important. It is navigable for a considerable distance, and at its mouth forms a delta of wide extent, exceedingly fertile with pasture lands, capable of supporting four herds of cattle to the acre, and more densely populated than any other part of the island. The tide ascends this river for a distance of 31 miles, and it is navigable for about 30 miles further, the vegetation along its banks, and along those of its tributaries increasing in luxuriance in proportion as we recede from the sea. The European settlers have fully appreciated the importance of this river, for it is here that most of their plantations are met with. The other rivers are comparatively unimportant, though

* Behm's *Geographical Year Book*, vol. I.

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nearly all of them are navigable for some distance from the coast, especially during the rainy season; and this, in a country having as yet no roads, is of considerable importance.

The climate of Viti has been described as one of the finest in the world, but this must be taken *cum grano salis*, considering that the archipelago lies within the tropics, though the assertion of a visitor to the islands, that only a strong constitution can expect to live there, is going too far.* The mean annual temperature amounts probably to 80° F., the thermometer ranging from 60° to 120° F. The heat is tempered by the south-eastern trade-winds, which prevail from April to December, whilst variable winds, mostly from the north and north-west, blow during the rest of the year, generally attended with heavy rains. Hurricanes occur but rarely, but prove disastrous to the plantations. In 1866 two severe storms burst over the entire group of islands, totally destroying the crops of yams and taro, uprooting the cotton plants and laying waste the newly-planted coffee plantations. These storms are all the more disastrous as they are generally succeeded by a long-continued drought, and it is satisfactory to know, under these circumstances, that a storm of equal force had not been felt for twenty years past. Rains fall throughout the year, but are most abundant from October to April. From June to October it is generally more or less dry and cool, though there are many deviations from this rule, according to locality.

The country is said to be exceedingly healthy. Intermittent fevers, which are the scourge of so many tropical regions, are altogether unknown. The only disease which a European settler has to dread is dysentery. It was not known before the arrival of the white man, and is due probably to the too exclusive vegetable diet. The skin and eye diseases from which many of the natives suffer, have been traced to the drinking of "kava," an intoxicating beverage made by chewing the roots of the *Piper methysticum*, to which some of the lower class of Europeans are likewise addicted.

The natural productions of Viti are of the most varied description, and it may justly be said that not only all tropical plants, but likewise many from more temperate regions will succeed there. Most important, probably, in the eyes of England are the prospects of Viti as a cotton-producing country. Cotton has indeed been introduced into Viti many years back, and in Dr. B. Seemann's opinion a country better suited to its growth could hardly be found. It was, however, only after a committee of the Cotton Supply Association had valued samples of Vitian cotton in 1859, at a higher market price than the average of American cotton, that its cultivation was taken up with some spirit. In 1864, 650 cwts. were exported; in 1865, 2400 cwts.; in 1866, 5880 cwts.; in 1867, 30 gins and five steam-engines were employed by the cotton planters; in 1873, 4500 bales, of 350 lbs. each, or about 14,000 cwts. are stated to have been produced; but the quality had deteriorated, and the cotton fetched only from 13*d.* to 22*d.* per lb. in the London market, whilst, had the old quality been kept up, it would have realized from 26*d.* to 28*d.* Direct communications with England are much to be desired if this branch of industry is to be developed, for under the present system the merchants' commissions at Leouka and Sydney amount to no less than 12½ per cent., to which freight and other charges have to be added.*

The mountain districts of Viti, for instance that of Namosi on the Upper Wai-levu, are well adapted to the growth of coffee, and coffee planters from Ceylon who visited the islands some years ago, speak in high terms of it as a coffee-producing country. The cyclone of 1866 destroyed most of the existing coffee plantations, but the injury has been repaired, and Viti, at no distant date, may prove a formidable competitor in the coffee market. The sugar-cane grows wild in many parts of the islands, and its juice is used by the natives for sweetening some of their culinary preparations, though they do not possess the art of making sugar from it. Of late years the European settlers have begun its cultivation seriously, especially on the Lavu Bay, though as recently as 1873 there were no mills to crush the cane. Tobacco is grown in patches near all the native villages, in sufficient quantities to supply the bulk of the population, who are great smokers.

Amongst the plants yielding oils and fat the Niudina, or cocoa-nut palm, is the most valuable. This palm could be planted with small trouble along most parts of the coast, and even at the present time the oil obtained from it by the natives, and paid as their share towards the expenses of the Wesleyan mission, forms no inconsiderable portion of the exports, amounting to from 400 to 700 tons yearly. The bitter oil, or Woondel of Indian commerce, is obtained from the dilo (*Calophyllum inophyllum*, Linn.), which is one of the most common littoral trees in the group, and is highly valued for its medicinal properties. There are, besides, the croton-oil plant, lately imported from the Tonga Islands, but grown only in fences, and the candle-nut (*Alewites triloba*, Forst.), which is exceedingly common, and might be collected in large quantities.

The staple article of food in Viti, as in all Polynesia, is derived from yam, taro (here called Dalo), bananas, plantains, bread-fruit, and cocoa-nut, and of these the yam is valued most highly, though the others grow to equal perfection. So important a part does the yam play in the economy of the islanders that their calendar is regulated by its ripening season. The varieties of this tuber distinguished by the islanders are numerous, and specimens 8 feet long, 100 lbs. in weight, and perfectly mealy, are by no means rare. The *taro* (*Colocasia esculenta*, Schott) is cultivated mostly on dry ground, and in taste has been compared to sea-kale, in shape to a turnip. There are several other aroideous plants furnishing food, amongst which the Diaga (*Amorphophallus*) is the most important. Amongst starch-producing plants, a species of genuine sago-palm (*Cœlococcus vitiensis*, Wende), which Dr. Seemann found growing abundantly in swamps on some of the larger islands, promises to become of the greatest importance. The natives were totally unacquainted with the value of this until Seemann initiated them into the nutritious qualities residing in the trunk. Vitian arrowroot is obtained from two species of Taccu, called Yabia by the natives, and the American cassasa-root has likewise been introduced lately. No cereals have been culti-

* *Colonisation in the Fiji Islands*, by R. U. London, 1871.

* Letter of Messrs. Devitt and Hett, *Times* 15th April, 1874.

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vated hitherto, except maize, which is not, however, valued as it ought to be. Amongst the plants used by the natives as vegetables there are but few which an European palate could relish; this is more particularly the case with the vegetables eaten with "bokols," or human flesh, to aid in its digestion. Fortunately a great variety of European vegetables has been introduced. They grow on the coast and would no doubt succeed even better in the interior. The colonist has thus within his reach potatoes, turnips, cabbages, parsley, cucumbers, the tomato, pigeon peas, shalots, sweet potatoes, and a variety of other plants. Nor need he want spices to render his food palatable. The macon supplies him with a kind of cassia bark, which may be used as a substitute for cinnamon; a species of nutmeg grows on the larger islands, on trees 60 to 80 feet in height; turmeric, and a species of ginger abound in the lower districts; bird's eye pepper (capsicum) has become naturalised in all parts of the Archipelago, and vanille likewise is being cultivated successfully. Even a substitute for stick-liquorice is furnished by a species of Dracaena, called mosawe or vasile toga by the natives, the root of which they eat baked, though as yet ignorant of the art of preparing an intoxicating drink from it. But it is chiefly when we consider the large variety of edible fruits that the favoured clime of Viti is brought most strikingly home to us. Bananas and plantains are most highly valued; the bread-fruit grows in regular forests, and at least thirteen specimens of it are cultivated. There are several trees of immense size, bearing a fruit similar to our apples; the fir (*Incarpus edulis*, Forst.) produces the Vitian chestnut; and that of the Tavola (*Terminalia catappa*, Linn.) has been likened to the almond. Tamarinds, the papaw, the guayava, lemons, oranges, and shaddocks, pomegranates, pine-apples, and lemons, all thrive well, and the same is said of the grape vine. The only intoxicating native beverage, called Kava or Yakoma, is prepared from the roots of the *Piper methysticum*, which grows in the greatest perfection at an elevation of 500 to 1000 feet above the sea. The disgusting manner in which this drink is prepared is well known, and its only redeeming quality consists in the fact that, unlike our European spirits, it does not render its partakers quarrelsome. Frequent indulgence in "Kava" entails however, diseases of the skin and the eyes. The Europeans have lately taught the natives how to extract toddy from the unexpanded flowers of the cocoa-nut palm. An infusion of the aromatic leaves of the matrada (*Missiesya corymbulosa*, Wedd.) is drunk by the Europeans as a substitue for Chinese tea.

The wood and bark of several trees are used to perfume the cocoa-nut oil with which the natives anoint their bodies. The sandalwood, which is confined to the south-western part of Vanua levu formed at one time the most valuable article of export, but even as long ago as 1816 scarcely enough was left for home consumption, and when Wilkes visited the islands about 1840, a few specimens for the herbarium could be procured only with difficulty.

The fibres of the malo or paper mulberry are manufactured by the native women into cloth, which is sometimes dyed with the juice of the Lauthi (*Aleurites triloba*, Forster). The screw-pines furnish materials for mats, and other trees for cordage.

Timber of excellent quality, both for house and ship-building, abounds. Most highly valued is the Dakna (*Dammara vitiensis*), the Fijian kowrie-pine, which grows to a height of 100 feet, and 4 feet above the ground has a girth of 18 feet. It is used for masts and spars, but its supplies are beginning to fail. There are, however, other cone-bearing trees, suited for similar purposes, besides the Damanu (*Calophylum Burmanni*, Wight) and several others. The Nokonoko (a casuarina species) furnishes a wood distinguished for its hardness; whilst the Dilo (*Calophylum inophyllum*, Linn.) is highly valued for its beautiful grain, and takes a fine polish. For covering the side walls of their houses the natives make use of the leaves of the sugar cane, of a screw-pine, of the boreti (a sea-fern) or of the makita (*Parinarium laurinum*). There are many other trees highly valuable as timber, and some of them yield gums, whilst others supply a sap used for dying purposes.*

A striking contrast to the variety and luxuriance of the vegetable world of Viti is offered by its fauna. The only domesticated animals kept by the natives are the pig, the dog, and fowls. European settlers have lately introduced the sheep; and although several flocks have been carried off by a disease, the nature of which has not yet been made out, there is some prospect of this useful animal becoming acclimatized. Wool, at all events, forms already one of the articles of export. Horned cattle has not as yet been introduced, and Australian beef and mutton form the staple of food at the European hotels at Levuka. Amongst other quadrupeds the rat is perhaps the most important and numerous. There are few birds, parrots being the most common. Amongst reptiles we meet with lizards and frogs—the latter a favourite article of food with the natives, who, as a rule, do not disdain to eat any kind of animal. The gigantic *Macrotoma heros*, some ten inches in length, is the most remarkable representative of the insect world, though ants and mosquitoes are far more troublesome. The macrotoma, like some smaller beetles, is roasted by the natives and eaten. Far more numerous than these land animals are the inhabitants of the sea and rivers. In the latter fish abound, and, strange to say, several species, such as the shark and lethrinus, which are not generally supposed to live in fresh water. The Trepang, or Beche de Mer fisheries are carried on with some vigour along the northern coast of Vanua levu, and some 300 to 500 piculs, of 140 lbs. each, are annually exported to China, where that rather repulsive looking animal is looked upon as an Aphrodisiacum. Tortoise-shell is plentiful, and if the indolence of the natives could be overcome, might furnish an important article of commerce.

Our knowledge of the mineral resources of Viti is still very scanty. Copper and antimony are said to exist, and clay of very superior quality is used by the natives in the manufacture of their pottery.

Taking into account the vast natural resources of the Viti Islands and the great variety of their produce, it must be admitted that their export trade has hitherto been but insignificant. The value of exports in 1864 amounted to 19,800*l.*; in 1867 it had risen to 39,960*l.*; and at the present time it is perhaps three times that

* For a full and interesting account of the vegetable productions of Viti, we must refer our readers to Dr. B. Seemann's exhaustive report published in the "*Fiji Islands*" *Blue Book* in 1862.

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amount. Cotton, cocoa-nut oil, tortoise-shell, beche de mer and wool constitute the principal articles of export, whilst the imports embrace Manchester goods, ironmongery, and cutlery, wine, beer, and spirits, groceries, ship-chandlery, wearing apparel, tobacco, and agricultural implements. Trade is facilitated by the numerous excellent harbours and roadsteads of the islands, amongst which that of Levuka, which is easy of access, has good holding ground, and offers every facility for the supply of fruit, vegetables, wood, and water, is the most important. This harbour has lately been provided with a light-house.

The inhabitants of Viti are for the most part Melanesians, and, like the natives of New Guinea, they are dark complexioned and have long woolly hair, which the missionaries, however, compel them to cut short wherever their influence reaches. It is, however, only in the interior that this original type is still met with. Along the coasts an admixture with the Polynesian Tonga islanders has taken place, which has left its mark not only upon the physical character and the language of the inhabitants, but has likewise influenced their manners, customs, and political institutions. The intercourse with the Tonga islanders still continues, one of their chiefs has gained possession of the Windward Islands (his residence being on Lakemba), and in his character of "Viceroy" of Viti, he exercises considerable influence in the rest of the group.

The character of the Vitians offers many contrasts. Superior in intelligence to all other Melanesians, they are warlike without being chivalrous, and in their continuous internecine contentions they have occasionally exhibited an amount of cruelty not probably to be matched in any other part of the world. But Mr. Consul Pritchard describes them in the most favourable terms. According to him they have broad and open chests, sinewy arms and legs, stout limbs, and great muscular strength. They are active and ingenious, and not devoid of tact. Under proper management they are docile and tractable. They will work if the produce of their labour can be secured to them, and this, Mr. Pritchard considers, is one of the great inducements offered for colonizing Viti. His estimate, however, is not supported by other authorities, who describe the natives as being exceedingly indolent and averse to continued labour, which they look upon as degrading. Major Eggerström exaggerates perhaps when he tells us (in 1863) that the natives who have abandoned heathenism spend their time in idleness, whilst the heathens continue to kill and eat one another. This much is certain, that the European planters felt compelled to look to other islands in order to procure labourers to till their fields. About one-third of the natives are supposed to be Christians, and a considerable portion of the remainder have abandoned their idolatrous habits, without attaching themselves to any Church. The Wesleyans, who first came to Viti in 1835, have made most converts, but the Roman Catholic priests, whose operations date from 1846, are likewise said to have met with considerable success, due, in a large measure, to the indulgence with which they look upon the innocent recreations and pastimes of the people. The Missions are supported in part by voluntary offerings of cocoa-nut oil made by the natives.

We need hardly state that no census of the native population has been taken hitherto, and the estimates respecting their numbers differ widely. Gaimard (1827) estimates the native population at 70,000; Erskine, trusting to information furnished by the missionaries (1849), makes it 300,000. These are the extremes. Wilkes, about 1840, estimates the number of inhabitants at 133,500; Pritchard and Smythe (1861) at 200,000; J. B. Thurston (1867) at only 100,000; Britton (1870) at 130,000. From an estimate published in the *Fiji Gazette*, we learn that the native population on the 31st December, 1871, amounted to 146,000 souls, of whom 70,000 lived on Viti-levu, 33,000 on Vanua-levu, and 43,000 on the smaller islands. This latter statement appears to be deserving of most credit. In considering the future of these islands it is of some importance to know that the native population is steadily decreasing. The wars constantly carried on by the native tribes, and attended by indiscriminate slaughter, will, in some measure, account for this decrease. Mr. Thurston, moreover, states that in 1867 there died in three towns as many as 128 souls, whilst the number of births did not exceed 14, and that Ovalau, which comes more immediately under the observation of European residents, was capable in former times of sending out 3000 fighting men, whilst now it can muster hardly 300, old men and lads included. The gradual extinction of the native population is proved moreover by the many ruined villages and deserted plantations which meet the traveller in the interior at every step.

Assuming the estimate of the native population, as given in the *Fiji Gazette*, to be correct, and adding the 2140 whites, it would appear that the mean density of the population is 18 to a square mile. The population would appear to be most dense on the smaller islands (41 to a square mile), whilst on Viti-levu there live 16, on Vanua-levu only 12 souls to a square mile. There is no doubt that the islands are capable of supporting ten times their present population, or about a million and a half of inhabitants.

The second element in the population of Viti, and in some respects the most important, is formed by the white planters and their descendants born of native women. Prior to the arrival of the missionaries only about four or five whites resided upon the islands, and up to 1856 their number did not exceed fifty, most of whom were engaged in trafficking between the islands, making use for that purpose of some fifteen decked boats built by themselves, and having a capacity of from 3 to 15 tons. On the appointment of a British Consul in 1859, the islands begun to attract some attention, and a number of white settlers were attracted thither. In 1867 there were already 400 whites; in the following year they had increased to 449, in addition to whom there were 276 half-castes. At that time the white settlers had already purchased from native chiefs 235,000 acres of land, only a small portion of which was however under cultivation. On the 31st December, 1870, there were 2040 whites, of whom 450 resided on Viti-levu, 500 on Vatua-levu, and 1090 on the smaller islands. Levuka still remains the seat of commerce, but the white settlers have spread over the whole of the islands. On Viti-levu their principal centre is the delta and along the banks of the Wai-levu River, the frontage of which they have acquired for a considerable distance into the interior. They have likewise settlements on Savu Bay, at Nadrouga, at Ba, and other places. The chief settlements on Vanua-

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Map of the VITI OR FIJI ISLANDS.

principally from Surveys and Explorations by
COMᵈᵉ WILKES, U.S.N. CAPT. H.N. DENHAM, R.N. 1857,
COL. W.S. SMYTHE, B. SEEMANN, E. GRAEFFE & OTHERS;
by E. G. Ravenstein.

Scale 1 : 1,200,000.

0 10 20 30 40 50 Nautical Miles
0 10 20 30 40 50 Statute Miles

Altitudes in feet. Soundings in Fathoms.
Coral Reefs.

The Lau Confederation embraces Lau, Thakaudrove (with Taviuni, Kamia), the Ringgold Is. & Cejand Bua or Mbua (the eastern part of Vanua levu and the Leeward Is.)
The chief of Mathuata is independent.
Viti levu and Viti i loma are more or less under the control of Thakaumbau, the Tui Viti, who resides at Bau.

OVALAU.

From a Survey by Capt. H. M. Denham, 1856.

0 2 4 6 8 Sta. Miles

Nuku ruka, Underwood Tr., Tukuruka, Tunuma, Toki Entr., Toki, Waitovu, Waitov, Levuka, Na Tambari, Totoga, Nukorokoro, Viro, Nakoula, Sasuma, Bidale Pt., Nalulu or Wesley Entr., Vu Malai, Ausoso, Landa, Nawandrau, Nakoula, Nawai, Naitasiri, Thangalala, Moturiki Cha., Ndandavutambu, Ndrathi Inilai, Ngaru Entr., Ngamitha levu, Ndrathi levu, Nakoula, Tuba Angle, Leluvia.

Alewakalo Pas., Alewakale (Round I.), Timboon, Asaua, Kinsilk I., Kawahandra, Tauthaka, Yasawa, Ethel Rf., Otovavesa, Matathondi, Sawailan (Asauailan), Drola (Nathoulla), Nanuia, Alceste R., Yageta (Yangata), Porpoise Shl., Viwa (Biva), NAVITI, Full of Coral patches, Fox I., Edd I., Agate I., Sinclair I., Waya 1641, Waya ladlai, White Rocks, Observy Pk. 855, Baldwin, Knivel, Davis, Totten, Castle Rk., Vano, Hudson Is., Walker, Carr I., Johnsons I., Alden I., Emmons I., Underwood Ge., Smith, Bateman I., Reynolds I., Linthicum, Yakaulaua, Perry I., Vunda, Ba R., Nandi, Malolo, Palmer, Malolo laitai, Sualib, Waldron I., Spieden, Malolo Rks., Navula Rks., Navula Pt., Lidai, Singatoka R., Ba (i.e. the Ba), Vitinuraw, Navosa, Ndawsaran, Singanganga R., Naividra Hs., Pickering Pk., Copper, Motivaitala, Na Aronga, Vaidai, Natathun, Lawalase, Navua, Indimbi, Serua, Red Bluff, Gravelly Pt., Whippy Pt., Bird I., Storm I., Beqa (Mbenga), Namuka, Elliot Rf., Yanuca (Stuart), Hamersley I. (Clark I.), Blair I., Thompson I., Vatu-lele, Flying Fish Shoal, Kandavu Passage, KANDAVU, Rakiraki, Sagun West, Tavua, Nambeta, Nasau, Vanuatu, Nangudi, Vitimera, Malolo, Mavana, Rakirakilala, Nanuca, Nanuca qeta (Nanawa), Charybdis Rf., Vaturo, Kaka Viti Levu, Veidrala, Tokoroturabu, Rewa, Rewa R., Mouths of the Wai Levu or Peale's R., Nakelo, Nakauthata, Nakauthata, Nakauthata

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levu are at Nandi and in the district of Thakandrova. Fine plantations have been established at Somosomo, on Taviuna, and on several of the smaller islands. Most of the whites are British subjects from the Australian Colonies; but there are also Americans and Germans, and a few individuals belonging to other European nations. As might naturally be expected there are amongst them not a few whose antecedents could not bear too strict a scrutiny. But thus it has been in many newly-settled countries; and on the establishment of a firm and regular government, the class of immigrants will no doubt improve, though even now there are amongst them not a few men of the highest respectability. If we are to credit R. U., who is too much inclined to look at the black side of things, the position of the planters is by no means an enviable one. "Always something will occur to destroy the crops—hurricane, blight, wet, or drought. Men with little capital must be content to live a sort of animal existence, away from all civilization. Their diet yams and salt meat, and the latter only when it can be kept from the flies." R. U. appears to forget that the question of diet rests entirely with the planter, and that no climate, even the most favoured, is exempt from vicissitudes which destroy the labours of the husbandman.

One of the chief difficulties with which planters had to contend was the difficulty of procuring labourers. The natives exhibited but small inclination to regular work, and hence sprung up the importation of labourers from the Hebrides and other islands of the Pacific, by means of which a third element was added to the population. We learn from a Parliamentary paper, that since the commencement of this immigration movement, up to the close of 1869, there arrived at the Viti Islands 1649 labourers, of whom 292 returned to their homes, 18 absconded, and 52 died, there thus remaining 1287 at the end of the period. These labourers are engaged generally for three years. Their wages amount to 2*l.* or 3*l.* a year, generally paid in merchandise, and they are fed on yams, taro, maize, and other vegetable food, with an occasional ration of pork. At the expiration of their term of service they must be conveyed back to their homes free of expense. There is no doubt that this labour traffic has given rise to numerous irregularities; but we agree with Mr. March that the importation of labourers is not objectionable, as long as kidnapping can be prevented, and their fair treatment ensured whilst they are at work on the islands.

In conclusion we will succinctly trace those events which have led to repeated offers being made to Great Britain to assume the sovereignty of the Viti Islands. They may all be traced to the accidental burning of the house of the American Consul in 1849, when several articles of furniture are alleged to have been stolen by natives attracted to the spot, and to losses suffered by other American citizens during the burning of Levuka by a native force. Commodore Boutwell was sent to the islands to enforce compensation; in 1855, he awarded $38,500 and to save himself the trouble of collecting so large a sum amongst a number of chiefs, he made Thakambau, the chief of Bau, responsible for the payment, thus investing him with a fictitious importance which his position as one of many independent chiefs did not entitle him to. The Wesleyan missionaries considered the award extortionate, but Commodore Boutwell was not to be induced by their remonstrances to moderate his demand, but, on the contrary, he arbitrarily raised it to 45,000$, with interest at the rate of 8 per cent. until it should be paid.* Hence was Viti saddled with a heavy debt, the payment of which caused no small trouble to its chiefs. The first event to which it led was the election of Thakambau to the dignity of "Tui Viti" or king of Viti, in which capacity, however, only a small number of the chiefs acknowledged him, whilst the whites ignored his authority altogether. Mr. Pritchard, who had been appointed British Consul to Viti, arrived there in 1857, and on the 14th of October of the following year the king and chiefs signed an Act of Cession, which the Consul lost no time in carrying personally to London. By this Act the "king" ceded Viti in full, in consideration of Great Britain discharging his debt to the United States, allowing him to retain the title of Tui Viti, and placing him at the head of native affairs. He likewise ceded 200,000 acres of fertile land. When Pritchard returned to Viti, in 1859, the king voluntarily conferred upon him the jurisdiction over all British subjects residing in his dominions, and on the 17th of December, 1859, he placed in his hands the whole government of the country, to be carried on "according to the broad and plain principles of justice and morality." Pritchard provisionally accepted these offices, and in the colonial papers he held out inducements to intending immigrants. But the Home Government, rendered timid by the Maori war then raging in New Zealand, felt little inclination to accept the proffered cession. They deputed, however, Colonel W. S. Smythe to report upon the condition of the islands. Colonel Smythe reached Levuka in July, 1860, and, partly accompanied by Dr. B. Seeman, the botanist, and by Mr. Pritchard, he made a tour of the principal islands. He found that Thakambau was acknowledged only by a minority of the chiefs, but that even those chiefs who held aloof from him, were anxious to be placed under British rule, which would be able to protect them against the aggressions of other powers, notably of the United States. Dr. Seemann, whose account of the natural resources of these islands is most valuable, appears to have been strongly in favour of annexation—not so Colonel Smythe, whose reasons for a contrary course we are not able to gather. The Government, however, acted on the advice of the latter, and Captain Jenkins, of H.M.S 'Miranda,' was deputed in 1862 to inform the king and other signatories of the Act of Cession, that the Queen declined to assume the sovereignty over the Viti Islands.

King Thakambau was thus thrown back upon his own resources in discharging his debt to the United States; and willingly he listened to the propositions of the representatives of a "Polynesian Company," started at Melbourne, who came to his residence in 1868, and promised, in return for certain privileges, to discharge his debt, and to grant him an annuity of 200*l.* to boot. A charter

* The Wesleyan missionaries were not alone in remonstrating against the extortionate character of Boutwell's award—for the superior American naval officer on the station, as well as other respectable Americans, supported them. Consul Williams, whose losses were valued by himself at 5001$ 35c., in the end received 18,331$. The claim must appear all the more unjust as Thakambau at that time exercised no authority whatever at Levuka.

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signed on the 23rd July, 1868, without the privity of the British Consul, or of the Commodore, conveyed to the company 200,000 acres of land; empowered it to make laws for all settlers on such lands, native or foreign; to regulate the customs and trade of the entire "kingdom"; to establish banks, and issue notes. The representatives of the company were however informed that they could not reckon upon the support of the British Government in enforcing the unprecedented privileges conferred upon them, and it was pointed out to them that Thakambau's authority only extended over a small portion of the islands, and that several tracts ceded would first have to be taken by him by force of arms. The company, however, paid the demands of the United States. They issued a prospectus representing Viti in the most roseate hues, and succeeded in attracting a number of immigrants. In the end, however, they collapsed, and none of their fine schemes have been realized.

In 1869 Mr. Hoskins Drew gave the Viti Islands a constitution, modelled upon that of the mother country. There were to be two Houses of Parliament, one of whites, the other of natives; and no law was to be enforced except it was sanctioned by the two houses and the king—*tous comme chez nous*. There were ministers of state, a supreme court, county courts, and all the parapharnalia of a civilised government. In the same year a hundred white settlers, with the approval of the king, asked the President of the United States to assume a Protectorate over the islands. But he too declined; and 37 white settlers then published a manifesto in which they called upon their fellow-whites to organise themselves as an independent community. The number of whites at that time is stated to have been 2300, of whom about 1000 were respectable men, who might be trusted with the formation of a Government. A large preponderance of the natives, it was believed, would readily acknowledge the new power, whilst the remainder could easily be kept in check by a body of fifty well-armed men. It is probably in consequence of this movement that the king was induced, on 21st November, 1870, to empower the European settlers at Levuka to form a body corporate for governing the town, and to levy rates and taxes for that purpose.

In the following year a fresh "constitution" was published and sanctioned by Government. The Australian authorities—who at no time exhibited the most cordial feelings towards these Vitian "Governments," but were most anxious that the sovereingty over the islands should be assumed by Great Britain—had to be remonstrated with on several occasions by the home authorities, and they were instructed to treat the Government, exercised by the settlers in the name of King Thakambau, as existing *de facto*. Similar instructions were issued to Commodore Stirling, commanding the Australian squadron.

The planters at first supported the new rule, but no sooner were taxes levied upon them, than they turned against it. Mr. Woods, one of the Vitian Ministers, who was at Sydney in February, 1872, for the purpose of raising a loan (in which he succeeded), purchasing a steamer, and bringing to maturity several other schemes of a financial nature, sadly complains of the refractory action of a few whites, who were aided and abetted in their conduct by Mr. Consul March, who had, moreover, directed masters of British merchant vessels not to pay harbour-dues, and who, on all occasions, treated his sable majesty's ministers with contumely, and the decisions of his supreme court of justice with disrespect. The white settlers on Viti had not been idle in the meantime, and on the 1st of March, 1872, they published a "Declaration of Freedom," in which they protest against the usurpation of power by a few British subjects, having an impotent native chief as their nominal ruler at their head, and pledge themselves to resist the collection of taxes. Later in the same year (22nd of November, 1872) the settlers at Ba, Nandi, and Nadronga formally seceded from the Vitian Government, and the former offered resistance to the advances of a Vitian force which was sent to their district in order to avenge the death of a farmer, who had been murdered by the mountaineers, together with his family and twenty labourers.

Captain Chapman of H.M.S. 'Dido' succeeded in restoring peace, though unable to allay the general discontent of the whites with existing institutions. In a memoir published by the Ba settlers on the 19th of March, 1873, they point out the incapacity of Rakumba's government, the reckless management of the finances by his ministers, and the inefficient administration of justice; and although the picture of maladministration which they unfolded may have been overdrawn, there yet remains the fact, that a *modus vivendi* had not been established through Captain Chapman's interference. The discontent found expression in the Vitian Parliament. Fresh elections were ordered by the ministers in June 1873, but as these likewise went against the government, the ministers advised the king that a despotic rule alone was suited to the country. A fresh "constitution" was published in September of the same year; the ministers appointed themselves for life, and, aided by a consultative council of whites and natives, they assayed to rule the country. But they failed lamentably. The planters refused the payment of all taxes; and had it not been for the presence of English men-of-war, open hostilities, attended by bloodshed, would have broken out. The resistance offered proved too strong in the end; the ministers resigned, and placed their powers in the hands of the English, American, and German consuls. Some idea of the mismanagement of the Vitian finances may be gathered from the fact that the debts contracted in the course of two or three years amounted at the close of 1873 to 75,000*l*., that the ministers who had been authorised by Parliament to expend 89,000*l*. actually expended 120,000*l*., and that the revenue raised in a single year, amounted to so large a sum as 45,000*l*., most of which was obtained from customs duty.

In the meantime, in January 1873, Mr. Thurston, Chief Secretary of State of the Vitian Government, had addressed a renewed offer of cession to the British Government, which has not yet been rejected. On the contrary, it has led to the appointment of Captain James Goodenough and Mr. E. L. Layard, the present Consul in Viti, as Commissioners, to report upon the feasibility of the government of the islands being assumed by Great Britain. On the 16th of January of the present year, the Commissioners visited the king at Bau, when they explained to him the results which annexation would entail. They stated that Great Britain had no

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desire to acquire the sovereignty over Viti except by the express desire and consent of its chiefs and inhabitants, and pointed out the benefits which British rule has conferred upon other islands like Viti, now forming part of her colonial empire. The king appeared to be perfectly resigned to his loss of authority, but pleaded that he should be allowed to retain his title of "Tui Viti." Subsequently the Commissioners visited the various plantations on Viti-levu. They found that the planters were unanimously in favour of annexation, and quite willing to undertake the settlement of all outstanding liabilities, including the land grant made to the Polynesia Company. On their return to Bau the Commissioners had a satisfactory interview with Maafu, the Tonga chief and Viceroy of Viti, whose dominions (the Windward Islands) they were about to visit when the last advices left Levuka (10th February, 1874).

Our task is accomplished. We have endeavoured to convey within a small compass some information concerning one of the most favoured island groups in the Pacific, the enrolment of which amongst the British Colonies sound policy demands. Even now our newspapers are teeming with articles on Viti or Fiji; fresh information may be expected from day to day; our knowledge of the past and present condition of these islands will no doubt be enlarged, and if erroneous statements have been made by us from want of more precise information they will be rectified. Yet the map with which we present our readers will prove of service for some time to come. It will enable them to follow current events, and impart information not to be conveyed by mere type and ink.

E. G. RAVENSTEIN.

"MY PARENTAGE AND EARLY CAREER AS A SLAVE."

SURROUNDED by beautiful mountain scenery, and situated between Darfur and Kordofan, under the jurisdiction of Muhammad Ali, the Pacha of Egypt who first conquered the town, is a small valley, or rather plateau, in the mountains, named Jebel Tegeley. As near as I can recollect, the valley of Tegeley might be about 14 to 16 miles in length by 6 to 7 broad, and it boasted of five villages at the period of my being taken away from my country. Two of these round-hutted, mud-thatched settlements, belonged to my family; and all five were subject to Chammaroo, the prince who exercised despotic sway over the inhabitants of our valley. My uncle was one of Chammaroo's warriors, and my eldest sister acted as nurse to the royal children. I dearly loved my father, who showered upon me such unmistakable signs of paternal affection that his partiality towards me created an ill feeling against me on the part of my mother. Her conjugal regard for my father was not of the highest stamp, so that I frequently came in for a scolding intended for my father, and frequently a slapping for myself. The first thing I remember in life was when I observed a little brat at my mother's breast. I must have been somewhat over two years of age at that time; for be it understood we African children are permitted to enjoy the sweetness of our mother's milk for eighteen months or two years, and during that period the mother never thinks of nursing another child till the last one is perfectly strong and able to walk about. The next, and the then youngest brother, barefacedly encroached upon what I considered my supreme prerogative. My mother appeared to hold him close to her bosom, and my aunt (I have forgotten all their names), with our friends and other relatives, were laughing and congratulating my mother for what under the skies I could not tell. I looked and looked again at the little naked thing till I became jealous of the preference shown to him, and from that day I plead guilty to hating the little usurper. I grew up, and through my uncle's influence I became a little lord in waiting to Prince Chammaroo's children, the eldest of whom showed me the greatest kindness. One of the little princesses also took a great fancy to me; but I disliked her because she was minus her hair on the whole of one side of her head, and at the time there was no perruquier in Tegeley to rectify the defect. The history of this want must be told. It was no freak of nature, but the result of an accident, which even now makes my flesh creep and my blood run cold at the thought.

Amongst the many beasts that inhabit the jungle in the neighbourhood of our valley, the lion is the king of the forest. It was seldom that these animals made their appearance during the day, but the moment that the shades of night began to overshadow us, the roar of these dreaded animals might be heard for miles as they issued forth from their dens to hunt up their prey. In their nocturnal prowlings these beasts often approached and frequently entered the villages, and woe was their fate whose house doors were loosely fastened, or the curs that happened to fall asleep in the "middle watch." On came the lions one night, and, as bad luck would have it, they found one of the doors of Prince Chammaroo's palace badly secured. The air was very sultry, and the whole family, including the prince, were sound asleep in the open courtyard. A lion, said to have been an old offender, cautiously entered the courtyard and seized the princess, who was then lying by her mother's side, seized her by the hair of the head, and immediately commenced dragging her away. The mother awoke and jumped up, the child screamed, and so terribly, that the prince instinctively clutched his sword and ran towards the door. By the assistance of a bright intertropical moon, he saw the lion dragging away his offspring, the child of his affections. The prince redoubled his speed, and, as the burden was rather heavy, the king of the forest was overtaken by the king of the homestead, and then followed a dreadful struggle for victory. The prince held his daughter by the legs, and tried to pull her away from the lion. The lion refused to let go his hold, and dragged both prince and child after him; the poor girl still screaming lustily. One, two, three, four, five, six, and more cuts with the sword on the lion's back, and at last the prince found himself with his child lying speechless and bleeding on the ground. Chammaroo took up the girl and ran back with her to the palace: on examining her they found that the lion had carried off one half of the hairy scalp. The wound healed up, but the hair never grew again, and hence my dislike to that unfortunate but very plain being.

At about the age of six years my father took me

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from court and made me a shepherd: every morning at sunrise I was seen opening the sheep-fold to let out the sheep and goats. One old ram used to lead the van, for the pasture grounds were well known to the veteran; and I reserved another to ride upon, the better to follow up the rear. On my way, I usually met two other boys from the neighbouring villages, with their father's flocks, and by mutual agreement mixed our animals together and took our stations on the pasture ground to prevent them from losing themselves in the bush. At even-tide the voice of every shepherd called his flocks, and they separated into three lots, each following its guardian to the fold.

Being the oldest of the boys, my pride was raised to no small degree when I beheld my father preparing a farm for me. This event filled my mind with grand anticipations of leaving the care of the flocks to my next brother, who was then beginning to work a little. Manhood, a landed proprietorship, a house, a wife to cook for me, herds of goats, flocks of sheep, and other items which constitute gentility in Central Africa, all floated before my mind's eye; but I was never destined to enjoy the charms of a settled and independent life. While tending our flocks between two hills, we espied two men making their way towards us. The foremost saluted us by asking a question quite common in the country,—"Have you any goats for us?" We answered, "No"; but I soon discovered the ruse that the villains had practised; for as soon as they came close to me, our would-be amicable strangers seized me firmly by the hand and pulled me away whether I would or not. I screamed, I roared, I fell down on the ground, but all to no purpose. We were too far away from our homes, the sun was setting, and, to facilitate my stubborn and lagging movements, one of the kidnappers procured a green switch and applied it very tellingly to my legs and their origins till they were all cut and bleeding. Late at night we reached a few farm-houses, and here, without even getting a drink of water, I was tied hands and feet and laid on the bare ground to rest. I cried all night, and before day dawn on the following morning the slave-catchers aroused me, and taking the ropes off my legs, forthwith commenced a march still further away from my home.

I was now a slave beyond a doubt. From being a companion of princes, I had dwindled away into a thing to be bartered for, to be bought, to be sold at the pleasure of another man. My dear father was far away from me, and I had no relative or friends to sympathise with me in my luckless destiny. I was distracted, especially when I observed my pursuer coming after me with a large hippopotamus-hide whip, and a sword slung on his shoulder. At noon we reached an Arab village of large dimensions, and went straight to the chief's house, where a long interview ensued in a language quite unknown to me. What arrangement had been entered into I could not tell, but at any rate I was sold. The ruffian who had kidnapped me went away, and I never saw him again, nor, alas! have my eyes ever since fallen upon parent, family, or friend of my youth.

On entering the house of my new master I was agreeably surprised by meeting an old acquaintance, Medina by name. She had been despatched on an errand by some of Prince Chammaroo's family, and, on her return home, she was intentionally waylaid by some of the prince's emissaries and sold to the Arab chief in whose house I found her. According to her own account, the Prince Chammaroo had applied to her brother for his sister to become one of his concubines. The brother, being a powerful chief, positively refused this command of the prince, and the result was that he secretly vented his rage, by conniving at the seizure and sale of the innocent and unoffending Medina. When she saw me, Medina expressed great pleasure at our meeting, but felt sorry to think of the cause that had brought us together. She advised me to do whatever I was desired, assuring me that the white man (meaning the Arab) would not care for taking our lives, and that killing us would not cost him a thought. We were firmly secured together with iron chains on our feet, the chain being first riveted on her right leg, and then secured with a key to my left. A strict watch was set over us, and we were never permitted to go far from the house. Medina, being the elder, frequently laid down plans for our escape, but those were never matured or carried out; the fear of being recaptured preventing active measures.

A short time after this a caravan consisting of merchants and travellers left the Arab village for a day's journey to the eastward. Our master joined them, and about sunset we reached another village inhabited by Arabs, but he was disappointed in his object: the merchants to whom he intended to sell us had left that morning. The market had been broken up, and we had to return home, our owner not having had even a single bid for our bodies. Another caravan was soon equipped upon a larger scale, and for a greater distance. This was to a large town called Kordofan, also under the jurisdiction of the Pacha of Egypt, and garrisoned by Egyptian troops. The first day we pitched our tents at a well of water, not having seen a single house on the whole of our journey. The second day was very tedious, for we had to pass through a country entirely bare of every vestige of vegetable matter, and the ground was so dried up that every now and then we came to earth-cracks—large gaps which yawned for want of water, and gaped wide enough to swallow an elephant. We continued our journey till late at night, when the guidance of some lights directed us to a distant village, where we arrived and reposed ourselves. We stayed there for some time, and shared the unfeigned goodwill of the people, who were uncommonly kind. Hospitality is a precept and a practice handed down from generation to generation by the patriarch Abraham. When he unconsciously entertained the three heavenly messengers, he was doing exactly that which is practised by the Arabs of the desert at the present day. "Beitná Beituk," My house is thy house! is, with a very few exceptions, the maxim of every dweller of the desert, and East Africa hardly yields to Asia in this particular. The more refined citizens will place the finest rooms in their houses at the disposal of the stranger. Their horses, their servants, the best fruits in their gardens, nay, even their own services are at the command of the guest; and that man is a black sheep in the flock who is found wanting in courtesy to the traveller, be he Christian or Moslem, Jew or idolater, gentle or simple, rich or poor. The name of the village was Albahar or Albeit, and near it was a Turkish camp, temporarily established

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for carrying on slave-hunts. During our stay we were taken to the camp, and put through various forms, which none but a slave dealer or buyer could imagine. The first thing we were desired to do was to show our tongues and then our teeth; our limbs underwent a serious examination also, but this was done privately in the farthest corner of the tent.

On the day following this examination the camp broke up and set out for Kordofan; we being directed to fall in. There were a few slaves secured by means of forked sticks to camels, and also a batch of Arab girls that had actually been hunted in the village and forcibly compelled to mount the soldiers' dromedaries. Two days brought us to Kordofan, the approach to this Muhammadan seat of learning being characterised by heaps of dead bones of man, camel, horse, and donkey. This was the largest town that Medina and I had seen, and we now began to imagine that we had arrived amongst the people that live at the end of the world, and whose business it is to kill all the blacks, and to use their blood as a dye for red cloth: our ideas were confirmed when we saw so many of the soldiers wearing scarlet caps. We gave ourselves up for lost, trepidation and despair seized our souls and bodies.

Arrived at Kordofan, we were both sold to another Arab, and on the second day after our transfer we saw our former master and some of his Tegeleyan friends mounted on beautiful Arab chargers, some of them no doubt bought with our blood. We watched the caravan till it got out of sight, and then poor Medina burst into a flood of tears, and vehemently called out the names of her brother, her relatives, and the bosom friends she had left behind in her dear home.

Four days after this we were sold to a Turk, a captain in the Egyptian army, and a very Nimrod in spite and cruelty. Medina was immediately made a member of the Agha's seraglio, and I was initiated into the secrets of making coffee à la Turque, besides running messages, and attending upon strangers and visitors to the captain's quarters. I very well remember the first person whose name I had to introduce to my master. He was a camel-driver and camp follower, employed in the service of the Egyptian Government, and had been despatched with four camel loads to a neighbouring camp. It appears that the miserable wretch was four days behind time; the moment therefore that the Agha heard his name, he jumped up in a rage, and calling the man by certain most unseemly names, ordered him to receive fifty strokes with a large cudgel kept for the purpose. The wretch groaned a death-like moan; he was thrown on his side and the bastinado was administered upon his shoulders. When ordered up after the castigation, his body was bleeding in different parts, and his cheek was skinned by the convulsive efforts with which he raised his head and struck his cheek on the ground after every blow. This was the way that the Agha answered every complaint that was brought to him. Soldiers suffered, civilians groaned under the lash, and every attempt at begging pardon was answered only by a double flagellation. My own sufferings while in the service of this monster augmented daily. If he called, he said that I ought to answer him no matter at what distance. On one occasion, having been sent on an errand by the head lady of the seraglio, he addressed me on my return with "Where have you been?" and then he commenced beating me; no ordinary blows were administered on that occasion. He kicked my body; he played at ball with my head, striking first on the one side and then on the other. I became almost senseless, while the blood was running out of my ears; and even till to-day, after the lapse of nearly twenty-nine years, I frequently experience a wheezing and deafness in the organs of hearing, especially during damp weather. On another occasion, the house being quite full of strangers, during visiting hours, I was ordered to make coffee, which I did and served out to the guests. Unfortunately, however, I had made a few cups more than was required: my master said nothing at the moment, but waited till bed time, and after I was sound asleep he seized a horse-whip, and, coming upon me unawares, punished me till I was quite speechless. I am persuaded he would have killed me had not one of the upper slaves, a confidential soldier, come into my room and taken the whip from the enraged Tartar.

Amongst the many visitors who frequented the Agha's house was a Turkish Effendi, who had settled as a merchant in Kordofan. He had seen myself and Medina on our arrival, and he wished to become a purchaser, but had been outbid by the Agha. He now offered a tempting price for my companion, and the Agha not being proof against the offer, at once sold her whom he had taken for his wife. I remained about six months the slave of this remarkable specimen of inhumanity, and was released from his clutches in the following easy and singular manner. One day a benevolent-looking Arab came and took coffee with the Agha. I was at my post and had just served out the aromatic beverage. Immediately after coffee I was ordered to go with the stranger, and to fetch some soap. I submissively obeyed, and trudged after the swift-footed Bedouin as fast as my young limbs would permit. The journey was interminable, according to my way of thinking, and I ventured to ask how to find my way back, particularly as the sun was setting. The Arab told me he should see that everything was right, and we arrived at a house where I met two more Arabs, one slave boy, and three girls from Darfur. Whether the Arab had cheated the Agha out of my value, or whether I had been really sold for soap, are questions that I shall probably not be able to answer till my dying day; but one thing is certain, and that is, I had now met with a number of playmates and a kind master. I entirely forgot to ask my way home on the following morning, and at this distance of time I can sincerely hope that the Agha was none the worse for not seeing me return with the soap. My new master's name was Jubalee, and those of his companions, Achmet and Mehemet, all natives of New Dongola. Mehemet was the youngest of the three, a professed prayer-loving Moslem, and a teazer to the slaves, being ever ready to apply the lash for amusement when he had nothing else to do, between his devotions. He devoutly and religiously shaved his head, leaving a little top knot on the crown, by which means, according to his belief, the angel Gabriel would pull him out of his grave at the Last Day.

I was the last addition to the complement of slaves, and the Arabs at once commenced making preparations to start for their country. They purchased a few camels, a horse, and an ass, some dates, corn meal and water-skins; and, thus equipped, we started across the desert of Bahayuda to Senaar, between the Blue

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and the White Nile. The journey occupied ten days, during which time we had to march across a country entirely composed of limestone and sand; not a single blade of grass, not a herb of any description was visible on this vast expanse of arid desert. We had to husband the whole of our provisions and water, particularly the latter, for the following reason. Our water-skins had been divided among the loads of the different camels; but the main supply was slung to the saddle of a spirited young grey camel, which was entrusted to my care. A female slave was taking a "spell" on the saddle whilst I was riding on the space immediately behind the hump and holding on to the after pommel. It was the middle of the day, and the sun was hot to broiling, whilst in the distance we observed that arrant deceiver the mirage, or, as the Arabs call it, Moyet-il-Jehannum, the water of Gihannar. The camels were pacing in a string one after the other, and all were silent, being afraid by opening his or her mouth to create an insufferable thirst. The water-camel was in the van, and before any person was aware we came upon a camel lying across our path: it was in a state of high decomposition, and our olfactory organs revolted at the pestiferous odour arising from that never-to-be-forgotten dead camel. All the beasts immediately began to inflate their nostrils and to prick up their ears; then followed a confused and involuntary dance—such a dance as might have suggested a new figure to a professed *danseuse*. I slid down the back of the camel, while the female slave was very unceremoniously pitched from the saddle. None of the other riders were unsaddled; but the stench made all their animals perfectly furious and entirely ungovernable. The water-camel was off helter-skelter to the desert, and the confusion that ensued was indescribable. Both master and slave were deeply interested in the burden of the water camel. "La ilaha ill Allah, there is no God but *the* God. Catch him! Catch him! Stop him! Stop him! Allah u Akbar, God A'mighty!" and so on. Noise, prayers, and religious ejaculations were all thrown away, the water-camel pranced, kicked and galloped until the whole of the skins burst open and discharged their contents upon the insatiable sands of the desert: be it remembered, this sad catastrophe occurred when we were full six days distant from the banks of the Nile, that being the nearest place where the necessary water was procurable. No cooking after this accident, and what little water was left was served out a few mouthfuls to each person at the time of our encamping for the night. The corn meal was given to us dry, and that, with a few dates, constituted the whole of our fare for five long days, which seemed fifty.

About noon on the tenth march, after leaving Kordofan, a glorious prospect opened before our eyes—that sight is still fresh in my memory, and if any of my companions, "shipmates of the desert," are still alive, they too, surely look back with the highest pleasure and the sincerest gratitude to that day, that epoch in our journey after leaving Kordofan. We stepped suddenly on an oasis, a delightfully verdant island in the midst of the sea of sand. To look upon grass was a goodly luxury to our scorched and bleared eyes; but here we had not only green grass, but green corn, green water-melons, and a fine green shade to rest under. The owner of the farm invited us to regale ourselves with the water-melons, and, in the meantime, he roasted some young maize for our second meal. We feasted on corn and melons, on water-melons and corn, on corn and water-melons, and on water-melons and corn again, and the whole of us retired to rest that night quite in good humour with ourselves and in perfect harmony and good feeling towards our neighbours and every animated being in the world.

Before leaving for ever our happy valley I must indulge in some reminiscences of it.

I have already stated that the valley of Tegeley is situated between Darfur and Kordofan. It is an undulating table-land, bounded by two ranges of low hills, the highest part of which might be about 300 to 400 feet; and in the centre is a water-course, flowing through the whole distance, some 16 miles, parallel with the Nile, south to north to the lower part of the valley. Dry in the dry seasons, during the rains it is a complete torrent, running some seven or eight knots, and in many places very deep and perfectly impassable. On either side of this mountain-stream the country is all under cultivation; in short the site is so thickly peopled that many of the inhabitants are compelled to make farms 4 or 5 miles beyond the principality. The ground which my father possessed there was not sufficient for the growth of corn for all our family; he therefore obtained a grant of land in the territory of a prince of the name of Daldoum Abshenet; and it was there that the greater part of our supplies were produced, and there also that the intended farm for your humble servant was cleared, and made ready for him. The inhabitants of the valley being mountaineers, are manly, and brave candidates for valour, and are expected to encounter and kill a lion;* and when successful, they are permitted to wear the skin of their victim as a mark of distinction. A short time before I was stolen away from my country, an uncle of mine killed a lion and thus raised the name of our family to the rank of nobles in the land. He was presented to Prince Chammaroo, who at once gave him the command of an expedition against a predatory horde that infested the neighbourhood of the country. My father and nearly the whole of the able-bodied men in the house at once volunteered to accompany the lion-killer, and after four days' march into some country to the eastward, that is to say towards Senaar, they came upon the robbers just at dusk, and completely routed them; taking possession of everything that the enemy had, besides bringing in four prisoners. The implements used in Tegeley warfare are spears and shields; and I never remember having seen a gun until I came to the camp of the Egyptian soldiers, between three and four days' journey from my country. The captives taken in the affray were shortly afterwards ransomed, and the mother of the chief of the enemy was sent to us, as a guarantee for the future amicable relations of the two tribes, my grandmother being sent as a hostage to the enemy's country in exchange. The valley, as far as I can remember, was very productive, the waving corn growing luxuriantly throughout all parts of it, and cotton was cultivated for the manufacture of country clothes. The weaver's trade in Tegeley is, unlike in other parts of the world, quite

* Lions are often bogged in the holes and pits made by nature during the rains.—*R. F. B.*

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an aristocratic employment. Besides the above productions, we have wild grapes, figs, and water-melons, all of which are eaten by the natives. The gourd or calabash grows everywhere and is used for dishes instead of porcelain, country pots, however, are made by the women. The year is there divided into two parts, the rainy season and the dry, when the ground is prepared to receive the seed, and houses are built or repaired. The tenements are of the circular form usually to be seen throughout Central Africa; and a rich family will have five or six of these huts about 10 feet apart from each other, the whole enclosed within a stone or mud wall 5 to 6 feet in height. There are generally two entrances into the courtyard, and the various houses within are appropriated thus—one or two as sleeping apartments for the family, a kitchen, a mill room, and a fold for the sheep and goats. The government is despotic, the power of life and death being vested in the hands of the prince. As I never observed any of the ceremonies of the Moslem faith in my country, and as the people are taught to believe in the existence of the soul hereafter, and as I never saw any idols or other heathen superstitions in the valley of Tegeley, I may infer, from our proximity to Abyssinia, that the religion is a corrupted form of Christianity. Very few of the men had more than one wife, and the children were brought up to industry the moment they were able to work, every encouragement being given them by their parents and relatives until they became able to provide for themselves. Husband and wife are usually betrothed to one another when children; and when the former has a home ready to receive his bride. The marriage is performed in the following simple manner. Of course all the friends and relatives are perfectly aware that the happy event will take place at some period or other. The young man therefore goes to the house where his betrothed is living, and orders her to cook for him, and to take the victuals to his hut. The bride obeys the mandate, carries the savoury dishes to the house of her future husband, and kneeling down before him, presents her handiwork for his acceptance, and from that day they are man and wife. I do not remember a case of divorce; nor are there, to the best of my memory, any priests in the country.

During my stay in my country there is only one rainy season that I remember vividly; and that was the one after my father cleared the farm for me. My brother Comang was now old enough occasionally to relieve me from the charge of the flocks, and I often accompanied my father to the farm to assist him in sowing. I began, in fact, to feel myself growing into manhood. Not to say that I was very precocious, but my father had procured a shield and some spears for me; and also pointed out a family in whose house I was to engage my future wife. Here is your house said that good parent; go and order such and such one, calling her by her name, to cook for you, and come and live in your house. With us a father's order is sacred, but if I disliked the Princess Chammaroo, the new person filled my mind with terror, for I was only about eight years of age, whilst she had reached the awful and marriageable age of twelve. I submissively obeyed; although I very quietly suggested that she might beat me. The parents received me with courtesy, and arrangements were made for my taking to myself a wife; but it will be seen from what has already been written that the affair was never brought to an end. My time was now divided between the flocks and the farm, and I occasionally accompanied my uncle and other sporting youths into the jungle. The following hunt took place towards the latter end of the rainy season. We had ascended a high eminence, and after eating some wild grapes in the woods, we made for an extensive valley in the principality of Daldoum Abshenet. We separated into various groups, but had not proceeded far down on the other side when a most beautiful sight opened itself to our gaze. This was a magnificent valley extending right, left, and before us for many miles; all covered over with low bush; and every here and there might be seen a small clearing for a farm. And, what was grander still to our eyes, a herd of giraffes or cameleopards were feeding in the jungle, not far distant from us. Without the least exaggeration, there must have been at least 200 of these swan-necked and most graceful animals scattered over a vast expanse of the woods below us; and nothing could have added greater novelty to the scene, than a view of our game nibbling, with mouths like the gazelles, the topmost branches of the extensive bush. My uncle was in ecstacies, and gave orders for the immediate division of the party into two sections; one to follow in the rear, and the other to advance to the front of the herd. My uncle and myself were of the former. The first game we encountered was a party of two kidnappers, waiting a chance for seizing some of our people on their return through the bush from their new farms. These kidnappers are common throughout the country. They are the offscourings of the people round about the valley of Tegeley, and being of debauched and idle propensities, employ themselves in covertly catching estrays, and in selling them to the slave-dealers. We let fly our spears at them, but the jungle on that side was so thick that they easily slipped away from us. Onward we pursued the giraffes till we succeeded in killing one. In the evening the whole party assembled at a place appointed for a rendezvous, and we produced our trophy; whilst the other party showed us the spoils of a fine old lion. This was skinned and the hide was given to the successful hunter; but as the wise men of our Gotham had decreed that no native of the Gebel Tegeley was to eat lion's flesh, the carcase was bartered for corn to a neighbouring tribe. We were, on our side, quite satisfied with our bargain. There is no coin or currency of any description in the place, the commercial system being that of barter. The sandal-maker gives his sandals for corn and hides; the weaver exchanges his cloth for cotton and provisions, and the whole tribe combine in performing gratuitous labour for Prince Chammaroo and the royal family, that *corvée* being equivalent to paying taxes. There was only one horse in the whole of the valley of Tegeley, and that belonged to the chief.

As I proceed with this narrative, new scenes and fresh recollections present themselves before me; for I now remember that the above horse was only ridden once a year by its proprietor. This was at the period of harvest-home, when the crops were all gathered in, and when the people were preparing to enjoy the fruits of their labour. The prince orders a grand assembly of the people, and after haranguing them about the prospects of the year, rides out of the palace-yard and gallops down to the centre of the stream, a

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distance of about 2 miles. He is energetically followed by the masculine portion of the populace, all of whom are dressed and ready for war. Besides the shields and spears before-mentioned, some of the warriors wear a knife encased within a leathern sheath, and attached by means of a leathern thong to the small arm between the elbow and the shoulder. The next object is to procure a goat to be sacrificed under the horse's belly, and for this purpose the warriors run about in all directions, proclaiming the name of Prince Chammaroo with stentorian voices, and giving a yell which is the signal of death. Altogether it is a most exciting "country custom." The goat being caught, the successful person almost flies with it to the position occupied by the prince, and unsheathing his knife, cuts the throat of the victim, and then hands in his palms some of the blood for the prince to sprinkle himself with. Every person follows the example, and the carcass of the goat is left for any one who may choose to take it away. Is this the scapegoat mentioned in the Book of Leviticus? The prince is dressed in loose Arab robes of foreign manufacture, the brighter the colours the more gorgeous it is in native eyes. Men of the higher class wear the surwal or common Arab loose trousers, besides a country cloth thrown over the shoulders.

Very early on the following morning we made a start, and after a short journey arrived on the banks of the Nile, immediately opposite the town of Senaar. Jubalee and Mehemet left us and crossed over to enjoy themselves, the good old man the Shereif Achmet being left in charge of the slaves and the beasts of burden. Here we fattened for a fortnight upon the products of the land, Indian corn in any quantity, water-melons, fowls from the neighbouring farms, with occasionally some camel's flesh; and for vegetables the young leaves of the water-melon and the Senna plant—Senaar being the noted spot for that useful and popular medicine.

A ludicrous incident occurred, in which I played a foolish part, during our stay in the valley of Senaar. The old Shereif sent me one day to fetch water from the river, giving me a wooden bowl for that purpose. Always a willing boy, especially since Medina's advice, I ran to the waterside and filled my bowl; but on lifting it up to return to our encampment, I cast a glance up the river, and, to my utter astonishment and dismay, saw an object with a black bottom and white top coming towards me, apparently at full speed. Fright at seeing this new and singular apparition at once riveted me to the spot, and it was some time before I could collect my senses. It was evident to me that the thing had eyes, for I now saw it bearing towards the place where I stood on the bank of the river. No time was to be lost. I bethought myself instantly, threw the bowl down suddenly from off my head, smashing it to pieces, ran at full speed to the old man, and breathlessly described to him the awful sight that I had seen. He asked for the bowl. "Broken, O Shereif!" I replied. He told me that I had only seen a ship, and severely reprimanded me for my foolishness; but his character of Shereif saved me from a good flogging.

The fortnight over, Jubalee and Mehemet returned from Senaar. They were accompanied by a vast concourse of merchants from this commercial emporium of the Upper Nile. Our caravan now swelled into a large body, and what with prancing horses, loaded camels, and armed merchants, we looked exactly like a large marauding expedition. We started on the morning after the arrival of the Senaar merchants, marched along the banks of the Nile, and in due time arrived at Dongola. Jubalee, Achmet, and Mehemet now dissolved partnership, and divided the spoil equally. It appears that I was the private property of Jubalee; his wife therefore retained me in the house to carry water, &c. This woman was of a very quarrelsome temper; and my master, finding that he could not live with her, sold me to Mehemet's father and went away to another part of the town. My new owner took a fancy to me almost at once, and declared that I should be brought up as a slave trader, but my lucky star was in the ascendant, and an Arabian Jew purchased me to look after his stores in the Dongola Arcade. He must have been a wealthy man, for his house was well furnished with divans and fine carpets, and his family were all dressed in rich silks and other fine cloths; besides which, his establishment was larger than any in the neighbourhood. There was very little or nothing to do at his place; and as he did not believe in "keeping dogs that did not bark," he sold me next to a native of the Berber country in Nubia.

My new master at once took possession of me, and carried me to his place some 2 miles from Dongola farther down the river. I forget this man's name, but I clearly remember one characteristic in his appearance, he was unmercifully pitted with the small-pox, although in other respects he possessed excellent proportions, a straight figure, fine limbs, and smiling features. When we left Dongola, we crossed another branch of the Lybian Desert, and passing the second cataract and the rock-hewn temples of Ipsamboul or Abou Simbel, we entered the village of Korti, or Goorti, the native place of our master. I say our, because there were three of us—a little Arab-featured girl from Senaar, a boy from Soudan, and myself. At Korti I was made to work at native farming. The inundation of the Nile had just subsided, and I was employed in driving the oxen that were attached to the sakya, or water-wheel. This was one of the means employed for irrigating the land by the richer classes, the poorer inhabitants used the shadouf, an apparatus consisting of a long lever suspended between two pillars of wood, a rope with a bucket being attached to one end of it, and a lump of mud or a stone at the other, to act as a counterpoise. The person who draws the water lets down the bucket four feet below him into the river, and dipping it full of water, raises it, with the aid of the weight at the other end of the lever, some five or six feet high, where it is emptied into a canal, which conveys it to the fields. Nubia is very severely dealt with by the Egyptian Government, every man being compelled to serve in the army, whether he will or not. In my time there was a press-gang both by land and water, perpetually harassing the inhabitants, and it was not unusual for all the people to fly from their houses, and live in the desert, for many days together. Taxes are levied on the water-wheels and palm-trees, every palm-tree paying one piastre, or two-pence halfpenny per annum.

The trip to Dongola had enriched my master, and he now made an addition to his family by marrying another wife. Amongst my master's children there was one

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urchin whose name was Haroun. He was ordered by his father to teach me the secrets of the Muhammadan religion. Haroun, therefore, commenced his task by seating me on the ground, tailor fashion, and by holding up one finger before me, saying at the same time, "Allah wahed" (God is one); but I so incorrigibly persisted in affirming that there were two Gods that my master was compelled to send me to the sheikh for better tuition. The old sheikh very wisely ordered me to look after his sheep and cows, so that I never heard anything more of the mysteries of the Muhammadan faith.

The village to which I was sent was called Dake: it boasts of an old temple, said to have been built in the reign of Cæsar Augustus. Crocodiles and hippopotami abound in this part of the river; the latter are very destructive to the fields; they come out of the water at night, and what corn they do not eat they trample under foot. Their stomachs are inordinately capacious; the hippopotamus presented by the late Pacha of Egypt to the Zoological Society in Regent's Park, London, is said to have consumed sixty pints of milk per diem. The crocodile of the Nile is also destructive; but his aim is to destroy human life.

After I had stayed some three months at Dake, the periodical congia or Nile boat called for slaves. I was shipped with the rest for the slave-market at Cairo, Hemet Hether, for that was my master's name, and his brother-in-law accompanying us. Passing through Bab-el-Calabashe, a narrow gorge in the river, we arrived at Assouan, the ancient Syene. Here we had to disembark and to walk overland for some 6 miles, till we reached the lower part of the first cataract. Syene is about 640 miles from Cairo. All about the cataracts the land is scattered over with ancient buildings, the ruins of which are grand even to the present day. The most picturesque spot is the island of Phila, the site of the beautiful temple of Isis, and the most sacred spot in ancient Egyptian mythology. The island is pre-eminently beautiful, being covered over with trees, and other luxuriant vegetation. As the author of *Lands Classical and Sacred* says, "The trees that grow in Egypt are not numerous. There are a few species of the acacia, the sycamore, and the date and doum palms, but the most characteristic part of Egyptian botany are the aquatic plants found on the edges of the lakes and marshes. Of these the lotus and papyrus are identified with the history of Egyptian arts, literature, and religion. The papyrus grew in Lower Egypt, and was therefore an emblem of that country; while the lotus, which flourishes in the upper countries, was emblematical of Nubia and Ethiopia. The papyrus is remarkable in Egyptian history as having been used as a writing material; many of our manuscripts of the Bible were written on leaves of the papyrus. The lotus still exists in Egypt; the papyrus has ceased to exist. 'The paper reeds by the brooks, by the mouth of the brooks, and everything sown by the brooks shall wither, be driven away and be no more.'"—*Isaiah* xix. 7.

Thebes, that city which at one time measured 30 miles in circumference and 9 miles in length, still retains parts of its bygone splendour, especially the temple palace of the great Sesostris, the two sitting colossi of the plain, Medinet Abou, the ruins of Luxor, and the council hall of the Temple of Kharnak. Then we have the Biban-el-Moluk or the tombs of the kings, and the wonderful excavations and mummy pits of Western Thebes, where you view the dead almost as if alive. This will recall to mind Horace Smith's address to the mummy, beginning with the well-known lines—

> "And thou hast walked about, how strange a story,
> In Thebes' streets three thousand years ago," &c., &c.

Mr. George Gliddon, late Consul for the United States in Egypt, an archæologist and statistician, calculates the number of mummies at present existing in Egypt at 500,000,000. From Gizeh to Dashour, a distance of about 60 miles, the ground is entirely covered over with pyramids and mummy pits at Sakkara, Dashour, Meydown, and Gizeh, in all numbering thirty-nine, and the Prussian scientific mission discovered the bases of thirty others. These most curious, most suggestive, and most renowned monuments of antiquity, have been proved beyond a doubt to be the tombs of the Pharoahs of Egypt, the first or great Pyramid of Gizeh being that of King Suphis, the cheops of the Greeks. The second pyramid is the tomb of King Sensuphis, or Cephrenes, and the third is the place of sepulture of King Mencarre, or Mycerinus. Neither must we forget the town of E'siout, the present capital of Upper Egypt, with its population of 12,000, and its pleasing historical association of having been the place where the infant Saviour and His mother abode when they fled from Judea to escape the persecution of Herod. Girgeh, with the Roman Catholic Convent of St. George's, and a population of 7,000; Denderah, with the sculptured representations of Queen Cleopatra and her son, Ptolemy Cæsarion; besides the twelve signs of the zodiac represented on the ceiling, showing that the Egyptians were not ignorant of the science of astronomy; the Temple of Edfou, the Apollinopolis Magna of the Romans, remarkable for its perfect state of preservation, and at present converted into a powder magazine for the Egyptian Government; Esne and Manfaloot, remarkable for their Gawazi, or dancing-girls; and above all, the cities of Alexandria and Cairo; the railway, the steam-boats on the Nile, and the overland route to India.

These are some memories that I have picked up since my school days in Scotland; but when I entered Cairo on a bright, a glorious Egyptian morning, the sun shining without an envious cloud to mock its brilliancy, bulbuls singing from the fruit-bearing hedges of cactus a song of thanks to the Almighty, who in His great and wonderful care for creation, has numbered and set apart the very sticks and thorns which constitute her nest, I was marched into it a miserable slave, unable to comprehend all the great moving causes around me, and existing only as the property of Hemet Hether, the Berber slave-dealer. Forty of us were counted as we entered the gates of the city, and the man who kept the tally grumbled at seeing so many masters and so few slaves. We took up our quarters at the foot of the Gebel Mokattam or Mokattam Hills, daily going to the slave market to be exposed for sale, and after passing through this routine for upwards of six weeks, I was purchased by Mons. Piozin, and sent down to Alexandria for the late venerable Robert Thurburn, Esq., Her Britannic Majesty's Consul in Egypt, by whom I was taken to Scotland, and left there to be educated.

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Reviews.

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EXPERIMENTAL MILITARY SURVEY OF THE RUSSIAN CONFINES OF ASIA.

II.

RESUMING our notice of Colonel Veniukof's work, we shall this time devote ourselves exclusively to Manchuria.* This immense and densely populated province of China is bordered on the north-west and north, from Abaigatu—a point near the Dalai-Nor—by the Argun and Amur Rivers, to the mouth of the Ussouri, and is flanked on the eastern side by the Russian maritime region which extends from the mouth of the Amur to that of the Tumen in the sea of Japan; on the south it terminates with Corea, the Yellow Sea, and a portion of the Great Wall. When Count Muraviéf (afterwards styled Amurski) secured the written sanction of the Emperor Nicholas (on the 14th of January, 1854), in spite of the objections raised by Count Nesselrode, for the annexation of the Amur country, and proceeded forthwith to occupy the left bank of that river, he was prepared with another project of military occupation, which was not, however, carried into execution until after the Crimean war.† Atkinson makes some observations on the extensive preparations which were in progress in his time at Irkutsk for the annexation of the Amur: this project had been long elaborated, and it presents a striking instance of the foresight of the Russians in their policy, and of the tenacity with which they adhere to preconceived plans. The Crimean war expedited the execution of the first part of the project, for quantities of troops and stores of all kinds, together with forced levies from among the unprivileged classes of society, were hurried through Siberia to the Amur for the colonization of its banks, as also for the reinforcement and defence of the Russian posts on the seas of Okotsk and Japan. Thus, after a lapse of nearly two centuries, Russia unceremoniously repossessed herself of the left bank of the Amur, from which, in 1660 and 1689, her freebooting Cossacks had been successfully driven away.

The second part of the project, which was an indispensable corollary of the first—the annexation of the stretch of country between the Ussouri and the sea—was virtually carried out in 1858, when, as Colonel Veniukof observes, Russia might have done anything she pleased with China. Availing herself of the awkward dilemma in which China was placed during the operations against her of the English and French forces, Russia secured by treaty the right of possession, which she had already assumed, of the left bank of the Amur, down to the mouth of the Ussouri, and of both banks below the mouth of that river, while she also secured the right of free passage along the Ussouri and Sungari Rivers for her merchants and travellers.

So anxious, indeed, was the Russian Government to benefit fully by the troubles in China in 1858, and so quick and unanimous were the Russian Government, the Russian Embassy at Pekin, and the Governor-General of Eastern Siberia, in their endeavours to reap that full benefit, that two separate treaties—identical in their provisions—were simultaneously concluded. One at Aigun (on the 28th of May, o.s., 1858) by General Muraviéf,* and the other by Admiral Putiatin at Tientsin on the 13th of June; neither Muraviéf nor Putiatin being aware that the treaty was thus being concluded in duplicate. In 1860 General Ignatiéf brought about the conclusion of a still more advantageous treaty, signed by himself and Prince Kung, in Pekin on the 14th of November, by which the Ussouri country was distinctly made over to Russia, thus legalizing the existence of the Cossack settlements founded on the banks of that river, and even on those of the Sungacha, in anticipation of formal sanction.† This later treaty granted to Russia a site for a factory in Kashgar, and provided for the establishment of Russian Consuls in that place and in Urga; it restored to Russian merchants the right of trading with Pekin and Kalgan, and in other places within the empire; it contained provisions for the facilitation of international and commercial intercourse; it abolished the imposition of duty on trade on the frontiers, confirmed the Russians in the possession of the lands which they had long before occupied around the lakes Balkhash and Issyk-kul, and annulled the treaties of Nerchinsk (1689) and Kiakhta (1727). Giving the text of this treaty, Mr. Ravenstein observes, with a commendable perspicuity, "The importance of this treaty can scarcely be overrated. Russia has now acquired a legal right not only to the country north of the Amur and east of the Oussouri, but also to the entire coast of Manchuria down to the frontiers of Korea. The value of this coast, with its magnificent bays and harbours, is great, quite independently of the Amur, and is fully appreciated by the Russians, who have rechristened Victoria Bay as the Bay of Peter the Great, and one of its ports they call Vladivostok, '*Dominion of the East.*' On the Amoor and Oussouri, however, the boundary-line does not bear the stamp of permanency. Russia holding one bank only of these rivers, whilst China holds the other, may at any chosen time furnish a government desirous of encroaching upon its neighbours with fertile causes of dispute, and when the time comes when the huge Chinese empire tumbles to pieces, the whole of Manchuria, with Leaotong, must become the prey of Russia."

In General Muraviéf's project much more, however, was aimed at than was even secured later by the above treaties, for it appears from Chinese sources‡ that overtures were made to the Chinese Government, not alone for the cession of the whole of the Amur Province, but also for that of the provinces of Girin, and Liautung in return for proffered aid against the Taeping rebels. If, however, in those times the Russians were under the impression that China was falling to pieces, and that they themselves were in a position to occupy

* Manchuria is so-called after the Manchu race.

† See "Russia on the Amoor," *Quarterly Review*, July 1861.

* This treaty was afterwards repudiated on the ground of certain informalities, when the Russians were called upon by the Chinese to evacuate the country of the Amur. They had on many previous occasions been urged to do so, for the Cossacks had incessantly levied black-mail from Chinese subjects, revisiting the site of the old fort at Albazin, and making themselves generally at home at various points along the river.

† See "Russia on the Amoor," *Quarterly Review*, July, 1861.

‡ Ravenstein's *Russians on the Amoor*, p. 140, and *vide* Tilley's *Japan, the Amoor and the Pacific*, 1861.

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and to retain their grasp on Manchuria or on a portion of it, they have now discovered that the Chinese in that province present a face so formidable that it is all important to take precautions against the possibility of dangerous aggressive operations. It is thus made to appear that Russia has overstrained herself. As a result of long and persistent endeavours, she has attained a position whence she apprehends that the menaces which she intended to hold out to China may any day recoil upon her own self.

The translator of Timkofski's "Travels through Mongolia to China" draws attention to the fact, that the Russian Government had a regularly established religious and scientific mission in Pekin for a whole century previous to 1827, and makes the following very pertinent observation, which is in a great measure applicable to the present day:—

"It is natural to inquire what advantages literature and science have derived from the Russians having thus possessed for 100 years an opportunity which no other Christian nation has enjoyed, and which, if allowed to natives of England, France, or Germany, would most probably have long since made us fully acquainted with everything relative to the history, the institutions, the government, &c., of this great empire (China) and its extensive dependencies. To this no satisfactory answer can be given. So far as we have been able to ascertain, none of the members of any of these successive missions, each of which remains ten years at least at Peking, have ever published anything on the subject of China, even in the Russian language." *

We can explain this very satisfactorily. There was not in Russia of that day a reading public, and printing presses existed only in some of the departments of state; even up to the present time the publication of all works, excepting periodicals, and books on certain important questions of the day, is more than unremunerative to their authors. Therefore when "His Excellency Count Nesselrode, on the representation of M. Rodofinikin, Director of the Asiatic Department of the Ministry for Foreign Affairs, obtained for Mr. Timkofski the patronage of the Emperor Alexander, in the publication of his journal," he initiated a practice which will be long continued in Russia.

The works of Father Hyacinth (Bechurin), who was in China from 1807 to 1821, were published under similar circumstances and simultaneously with Timkofski's, the latter having availed himself largely of Hyacinth's MSS. and assistance: this is the earliest and sole standard work on China in the Russian language. The results of nearly all other Russian travels in the far East, as well as in the more western parts of Asia, have been handed down to us by Western Europeans, as for instance, Everard Isbrand Ydest (1698), Lange (1730), Pallas (1768), Middendorf (1845), Florio Benereni (Bokhara Khiva) (1725), and others too numerous to mention.

While on this topic we may as well refer to Mr. Struve, who is quoted by Timkofski at p. 19 in vol. i., and who in the German language gave an account of the journey of the Russian mission to Pekin, in 1805. We make this reference partially with the object of drawing attention to the curious fact that Klaproth, in a note to Lloyd's translation of Timkofski, accuses Struve of palming off a "pretended journal" on the public, even while he himself interpolates in further annotations references to the scientific forgery which he must then have been concocting, and which has been traced to him and exposed by Sir Henry Rawlinson and the late Lord Strangford.*

The country of Manchuria—traversed by the first Russian Envoy to Pekin, in 1685, and by numerous successive Russian missions, and so well described in the letters of the Roman Catholic missionaries, commencing from 1838—is tolerably well known to us, even from the published accounts of recent journeys. Exclusive of the purely Russian information on Manchuria, we have English descriptions of routes, and of the country generally, which enable us to form quite an independent idea of that province of the Chinese empire; while Davies and the American Wells Williams have given us ample accounts of its condition, history, and population, with every variety of details on other points.†

M. Veniukof says:—"The mathematical geography of Manchuria is based on two very different orders: in the first place, on the geodesical labours of the Jesuit Fathers in the 17th century—of Bouvet, Jartoux, and Fridelli; and in the second place, on the observations of the Russian astronomers, Rashkof, Usoltsof, and Gamof on the Amur and Sungari Rivers, and on those of Englishmen in Liau-tung. Up to the year 1854, all maps of Manchuria were constructed on the bases of the thirty-

* Mr. Lloyd was not aware when he wrote this that even while he was writing, Father Hyacinth, who travelled on a mission to China, through Manchuria, was publishing his numerous works on that empire and its dependencies.

† Not more than a year age we noticed in the *Turkistan Gazette* a mention of the discovery of an account of Isbrand's journey in the archives of Omsk. In alluding to this the writer seemed to be unaware of the existence of the work in the Dutch and English languages. It was printed in a separate form and is to be found in Goadby's collection of "Entertaining Accounts of all the Countries of the known World—MDCLII."

* Father Huc appears to have doubted even Klaproth himself, for, in 1848, he wrote as follows in allusion to that self-constituted authority on the geography of China and of other portions of the globe:—"The zeal of a writer will not always suffice to describe countries in which he has never set his foot. To write travels in China, after a saunter or two through the factories of Canton and the environs of Macao, involves the danger of speaking of things that one is not thoroughly acquainted with. Although it has been the good fortune of the learned orientalist, J. Klaproth, to discover the Potocki archipelago, without quitting his closet, it is, generally speaking, rather difficult to make discoveries in a country which one has not visited." Huc might have added, "Without in the end putting his foot in it," had he been gifted with great foresight. With reference to the forgery by Klaproth, with which he imposed upon the English and Russian Governments, we may here observe, although with us the thing is almost settled and now being forgotten, that it seems strange that the Russian Foreign Office could so easily have been imposed upon. It must have been thoroughly understood in Europe at the time that Klaproth was no friend of Russia, as is evidenced in his annotations to all translations of Russian works, and in all his criticisms on them. We may have been partially blinded, and pardonably so, by that very fact. Colonel Veniukof, who has been Klaproth's champion, as well as most Russian geographers and orientalists, ignore this, and continue to place implicit reliance on the man and on all his theories.

† We have been recently favoured with two papers on Manchuria, one by the Russian Archimandrite, Palladius, who traversed the well-beaten track up the Girin and Nonni Rivers, to Aigun, on the Amur, and another by the Rev. Alexander Williamson, on the southern portion of the country (see *Journal of the Royal Geographical Society*, vol. xxxix., for 1869, and vol. xlii., 1872).

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four points determined by the Jesuits. The Russian surveys, up to the valley of the Amur River, are dependent on the twenty-six points determined by Englishmen and Russians. As there is no striking difference between the results of the geodesical labours of our own times and those of past centuries, it consequently happens that of all portions of Central Asia, contiguous to Russia, Manchuria is best known topographically, and the map of that country is so far correct that without fear of falling into any great error one may compute its general area at 15,420* square miles [German?]. Five-sixths of this extent belong to the water-system of the Amur, while only one-sixth of this area falls to the share of the basins of the Yellow Sea and Sea of Japan."

Manchuria, which we call a province in the wider interpretation of that name, is in military and administrative respects divided into three governments—that of Girin of the Amur (Saghalien-Ula), Tsi-tsi-har, or Daùria, (or Manchuria Proper), and Shing-King (Liau-tung).

The topographical and hydrographical features of this country are well laid down on the Rev. A. Williamson's map, which accompanies his paper in the *Journal of the Royal Geographical Society*, by which he shows, as he states in his text, that "the bulk of the country lies like a parallelogram across the map north-east by south-west." This does not exactly correspond with the shape of Manchuria as given by Colonel Veniukof in the excellent map attached to his work. According to this map, Manchuria is traversed, or rather bounded, on its western and eastern sides by ranges of mountains, stretching almost due north and south. The western range is the Great Hingan, and that forming the eastern boundary is the Chan-Boshan, called by Wells Williams the Sih-hih-tih Mountains. Lying between these two ranges, Manchuria is represented by Colonel Veniukof as a parallelogram lying direct north by south, somewhat losing this shape at its southern extremity. The northern range, following the course of the Amur, from north-west to south-east, and thence again to north-east, goes by the name of the Iluri-Alin inside the upper bend of the Amur, and that of the Little Hin between the Sungari and the Amur. This latter is erroneously said by Wells Williams to be the "Yablonni Khrebet," which with all its bulk lies north of the Amur, notwithstanding that connecting links, broken by the bed of the Amur, do exist between the Manchu and Siberian mountain systems. To put it as Wells Williams does, "the Inner [Great] Hingan or Sialkai range extends over [borders] a great part of [Eastern] Mongolia, commencing near the bend of the Yellow River, and stretching in a north-easterly direction, forms in Manchuria three sides of the extensive valley of the Nonni [Naùn], ending between the Saghalien [Amur] and Songari at their junction." Thus, as we see, Manchuria is on all four sides (in the south it is separated from China Proper by the Liau-tung range) surrounded by mountains, which drain off their waters from every possible direction into the very centre of this immense basin. The hydrography of the country presents in this respect a very remarkable feature, that of two rivers flowing from diametrically opposite directions, and then at right angles from their point of junction shooting off towards a third in a single stream. This is strikingly illustrated in the confluence or rather meeting of the Nonni River from the north-west, with the Girin from the south-east, both of which then by a combined action propel their united waters, under the name of Sungari, in a north-easterly direction. Comparing Mr. Williamson's notes with those of Father Palladius, we find that the first, adopting the theory of Wells Williams, who says that the Sungari rises in latitude 42°, positively states that the river which runs by Girin and Pe-tu-na to meet the Nonni is the head water of the Sungari, and that the Nonni is a mere tributary of the latter. Moreover, he makes this river enter Mongolia in latitude 44° 30′ after passing Girin. This latter misstatement, however, we are inclined to regard as a slip of the pen. With reference to the respective claims of each of these streams to be considered as the parent stream of the great Sungari, or Ta-kiang, we find that the second, or Russian, traveller "considers the Nonni to be entitled to rank before the Girin-ula as the parent stream of the Sungari, as well on account of the greater volume of its waters as of the greater length of its course." Father Palladius must of course be accepted as the better authority on this subject, for while Mr. Williamson's travels did not extend up the Nonni, the Archimandrite travelled along that river up to Mergen. Strangely enough Colonel Veniukof entirely disregards the Archimandrite's authority upon this point, and falls in with the view of Mr. Williamson, through too blind a faith, doubtless, in the accuracy of Wells Williams. For our part, we will venture to say that, failing the necessary conditions for the formation of a large lake, the Sungari is the accidental escapement of the meeting of the Girin and Nonni, so that bearing in view also their respective courses, and the relative direction of the Sungari, they must be regarded as losing their identity in the latter.

Although mountainous at its extremities, the principal features of Manchuria are its plains and valleys. The plains are those of Liau-tung, of Nonni-Sungari, of the Lower Sungari, of the Lower Ussouri, and of the Sungacha (the basin of the Hankai Lake). The first of these constitutes the most densely populated district of Manchuria; the second plain is the broadest in extent; it commences from above Mergen, and stretching southwards along the Nonni, widens out to a vast expanse at the outflow of the Sungari River. This plain being almost perfectly horizontal, the Nonni flows very sluggishly, forming great lagoons of stagnating water, and making the surrounding lands generally swampy. Among the results of this slow current is the formation of quite an archipelago of islands at the outflow of the Sungari, and at the mouths of some of the tributaries of the Nonni. The valley of the Sungari contracting towards the north is one of undulating meadows, partially covered with forest growth. Within a distance of 135 miles from the junction of the Sungari with the Amur, this valley opens out again into a vast and seemingly boundless grassy plain, with a great proportion of morass. From the embouchure of the Sungari this is more or less the character of the country on both sides of the Amur, even beyond Habarofka, and up the left side of the Ussouri, as far as its affluent the Nor. In parts, the spurs of the Kantai mountains (a northern bifurcation of the Chan-Boshan) project up to the left bank of the Ussouri,

* Wells Williams estimates it at 700,000.

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between the Nor and the Niman; but higher up this valley the lands are so level and depressed that they are often completely inundated by the overflows of the Muren and Sungacha Rivers. South of the Hankai Lake, the country is one of alternate hills and valleys, within the Russian limits. Here Manchuria is bounded by the well-forested Kantai Mountains, stretching northwards from the Tumen River in two parallel ranges: the main one extending along the western or left bank of the Muren River, and the inferior or more eastern range belonging, as Col. Veniukof says, in its entirety to Manchuria, and forming the boundary in this direction between the Russian and Chinese Empires.

Being situated between latitudes 39° and 49° N., Manchuria is in the same parallels as France and Italy. The country is well irrigated, and enjoys plenteous showers, and the vegetation is accordingly rich and varied. The climate, however, differs very much from that of the countries in corresponding latitudes in Europe—the experience of recent travellers and the results of their observations tending to prove that the summer heats are more moderate in Manchuria than in Southern Europe, and that the winter season is more rigorous even than in Northern Russia. The exhalations from the marshy lands moderate the heat in the summer, while they also occasion great falls of snow in the winter. In Northern Manchuria, above the 51° parallel, the winter lasts six entire months, from the end of October to the end of February. At the same time, in Southern Manchuria or Liau-tung—according to the Rev. Mr. Williamson—"the variation of the temperature is much more felt. In summer, the flat surface, hardened by the sun, reflects its rays, and in winter radiates the cold." The consequence of these conditions of climate is that the country abounds principally in forest and meadow. Of all the countries conterminous with Russia, Manchuria alone has no steppes of the Central Asian kind. In the north-western mountain districts (Daùria) the forests are composed of pine, fir, cedar, &c. In the basin of the Nonni, however, from the western slopes of the Great Hingan, the forest growth includes leafy varieties from the oak, black birch, lilac tree, and the maple, to the cork tree in the Kantai Mountains in the east.

This country is famous for the medicinal root called gin-seng *(Panax quinquefolium)*, which the Chinese pharmacopeists call orhota, or first of all plants—and which is prized by the Chinese above all the products of the earth, excepting diamonds and precious stones. This plant is now cultivated artificially, but is by no means scarce in the valleys of the Upper Ussouri, where it prefers recesses never visited by the rays of the sun. It is sought for by hundreds of Chinese, who obtain on an average about forty plants each, and a root five inches long is worth about five shillings. It is considered by the people as a panacea against all ill.* Khien-long in his famous poetic work written in the Chinese and Manchu tongues, and published in sixty-four different characters, speaking of the south-eastern portion (Shing-King) of his native country—the cradle of his race—describes it as "a surpassingly lovely alpine country, filled with recollections of the past, beautifully adorned with meadows, and superbly enriched with springs and rills of pure crystal water, enjoying a fine air, possessing many holy mountains, and inhabited by an unsophisticated, happy, and peaceful race of men. He pronounces it a classical land of patriarchal simplicity, honesty, and truth, lightened by the best of the stars, and protected by good genii. It is also the much praised land of Loh, the mother country of Kioro the Golden, the great ancestor of the Manchu sovereigns, so gloriously famous in Chinese tradition.

"The city of Mukden is as much distinguished from other cities as is the dragon from the tiger among beasts. The zephyr of the mountains which plays over the land, not alone softly hastens the opening of the buds and the blooming of the flowers, but also produces men who are destined to become the princes of the earth."*

Amyot, in his notes to Khien-long's rhapsody, has observed that Manchuria, and this part of it in particular, must nevertheless be considered as a wild, stern, uninviting, and almost uninhabitable region, infested by wild beasts. Mr. Semenof, in his volume of the Russian annotated edition of Ritter's *Erdkunde von Asien*, says that this account of it is doubtless a correct one,† but [Mr. Williamson has recently undeceived the world as to this notion, for he says of it, describing its loveliness, "It is not that barren, bleak, and lawless country generally supposed."

The principal occupation of the inhabitants of the country are agriculture and ship-building, which latter creates a lively business of various crafts. The ship-building is carried on chiefly at Girin and Tsi-tsi-har. The Girin, Nonni, and Sungari are alive with boats and junks. Mukden is in the principal centre of local industries; Girin, A-she-ho, and Ninguta ranking after it in this respect. The principal seaport town of Manchuria is Newchwang, on the Liau-tung River, the commerce of which place increased, between the years 1864 and 1868, from about 700,000*l.* to nearly 2,000,000*l.*, which shows its growing importance to English shipping. The imports, however, exceed the exports by a great deal, and the import trade with China Proper, chiefly conducted in foreign bottoms, is said to have developed more even than that with foreign or European countries. Judging from what he saw of Manchuria on three different occasions, Mr. Williamson believes it to be on the whole "a country of great promise."

Besides the river highways, which are exceedingly animated with traffic, there are a great many roads which connect Manchuria with Pekin. The roads leading from the Russian territories are those which connect Passiet harbour with Nanguta (395 miles); Vladivostok with Nanguta (about 200 miles, of which about 107 miles lie through Russian territory); the Ussouri with Nanguta (about 265 miles), the Ussouri with San-Sin (240 miles); the embouchure of the Sungari by San-Sin with Girin (491 miles), Blagovestchensk through Tsi-tsi-har with Girin (685 miles); these roads pass from the north and east into the heart of Manchuria. Manchuria is also accessible from the Aigun. Thus,

* Ravenstein's "Russians on the Amoor," *Quarterly Review*, July 1861.

* Semenof's *Manchuria and Mongolia*, Annotated Russian Edition of Ritter's *Erdkunde*, p. 19, vol. i. St. Petersburg, 1856; and see Williamson's "Notes on Manchuria," *Royal Geographical Journal*, 1869, where this same passage is epitomised.

† Semenof's *Manchuria and Mongolia*, Note 190, vol. i. St. Petersburg, 1856.

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from the frontier town of Tsurukhutai one cart road leads direct to Mergen (318 miles), and another to Tsi-tsi-har (360 miles). These roads conduct over passes of no great altitude, for the Great Hingan Mountains are not known to exceed a height of from 5000 to 6000 feet. There are, however, other roads leading to the Nonni River over passes which are practicable for wheeled carriages. To the south of the Chal affluent of the Nonni the Great Hingan Mountains constitute the barrier between Manchuria and Eastern Mongolia, but to the north of that river's source, as far as the Amur, those mountains belong in their entirety to China; and it is across this northern section of the range that the roads leading from the Russian centre in Eastern Siberia pass into the Chinese province. "Throughout this extent of 650 versts," says Colonel Veniukof, "not less than three passes are known to us, and probably there are more." The passes in actual use are the following:—

a. From the Gan, an affluent of the Argun to the Kamara, a tributary of the Amur;

b. From the Khailar River to the Namin (a tributary of the Nonni), lately explored by Captain Kropotkin, and minutely described by that officer; "*this pass may be easily traversed by a light train of wheeled carriages;*" and

c. From one of the affluents of the Khailar to the Yal, a feeder of the Nonni; over this pass there exists a regular post road which runs from Tsi-tsi-har to Khailar, which was traversed by Isbrand Ydes, and, much later, by Mr. Lange.

The country has, as we have said, a population of about 12,000,000, located principally in the river valleys, and thickly congregated in the cities. The southern and more favoured portion of Manchuria is the most populous: it boasts 8 to 9 millions of people; yet the great centres of trade, even up to Tsi-tsi-har and San-Sin, have also a very large number of inhabitants. The population is mostly composed of Chinese, who fill all government offices and have so denationalised the Manchus, that the latter are fast losing the distinction of their caste. This is curious, and is of no small importance to the Russians. The Manchus seemed to have emigrated or followed their great leaders in early times to China, when they overran and conquered it. The vanquished have taken possession of the land of their conquerors, who do not even exercise any authority in their own country. Convulsions in China would thus be favourable to any designs of conquest from the north, the execution of which is further facilitated by the presence in Northern and Central Manchuria, of a large proportion of Tungans, or China-ised Muhammadans of the Turk race. These people are particularly numerous at Girin, Pe-tu-na, A-she-hoh, and San-Sin, and hold the Chinese, notwithstanding that they have adopted the habits and customs of the latter, in the greatest abhorrence. The Tungans are an energetic, healthy, and sober people, preserving a distinct feeling of nationality, and forming a compact body of great power and influence.

Mr. Veniukof says of Manchuria:—"A country with an area of 15,000 [? German] square miles, and with a population of 12,000,000, which is able to provide all the requirements of its own existence—a country which of all those beyond the Great Wall of China is most prized by the rulers of the great Chinese Empire—is the very country which deserves our special attention in military respects. It may be said that of all the Asiatic countries which are conterminous with Russia, this country alone can assume towards us a menacing, or *at the least*, an aggressive attitude—a circumstance all the more disadvantageous to us, because, owing to the sparseness of the population along the Amur, and the great distance of our line from the centres of our power, the Amur country is left open to attack . . . . . History has shown that the Chinese have once gained the ascendancy over us in that quarter."

Colonel Veniukof then enters into the number and the distribution of the forces in Manchuria, pointing out their formidable strength, and the great weakness of the Russian *lines of defence.** He says: "The Chinese have 37,539 officers, soldiers, and sailors in Manchuria; and that if the Government of Pekin were to commence now to reorganize this army, as it has done with the army in China Proper, where the troops are armed with rifles, this force would be more than sufficient to place us in a very difficult position, after a first collision on the Amur. We have not a single fortified depôt of arms in the whole of the Amur region."

The vulnerable points along the Russo-Chinese frontier are—on the Argun, between Abaigatu and Aigun, where parties of horsemen could inflict a great injury on the Russians; at Aigun and Blagovestchensk, which latter could easily be demolished by artillery from Amba-Saghalien; at the embouchure of the Sungari—the Chinese coming up from San-Sin,—and at numerous other points in the same direction.

The Chinese might also, with equal ease, seize the Russian maritime province, aided by the Coreans, who decline up to the present day to have any dealings, private or official, with the Russians.

Whatever roads the Chinese might adopt for aggressive operations against the Russians they would always have the great advantage of falling back, in the event of a repulse at any quarter, through countries where they would always find abundant supplies. Moreover, in falling back they would but concentrate in the towns in their rear, the nuclei of their strength and material resources.

"In the event of hostilities with China," Colonel Veniukof observes, "we might occupy Khailar, Aigun, Hun-Chun, and even San-Sin, but it would be dangerous to penetrate farther. If we had a strong fleet on the Pacific, we might blockade the Chinese ports in the Yellow Sea, especially Newchwang, and so inflict a serious blow on Manchuria; but it must be remembered that the estuary of the Liau is shallow, and can be protected by submarine mines. After concentrating," he proceeds to say, "a sufficient force on the Amur, we might, if we wished to seize any Manchu territory easily, and with great advantage, occupy the strip of country watered by the left affluents of the Ussouri as far as the Kantai Mountains, where the Manchu population is sparse."

On the Ussouri, the Russians occupy an advantageous position for aggressive operations.† The right bank of

* The line of the Argun extends 440 miles, that of the Amur 1130 miles, and that of the Ussouri and Sungacha 419 miles: the frontier line from the latter river to the mouth of the Tumen is 227 miles in length.

† The largest Russian settlement and post in this direction is

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the Ussouri, which is the most elevated, and along which the Russian military posts are stationed, commands the lowlands on the opposite side, and aggression seems at present to be more inviting from the eastern than from the western side of that line.

"Strategical considerations," Colonel Veniukof observes in conclusion, "should alone urge us to hasten the strengthening of our position in the Amur region; we should more especially promote the colonisation of that country, in order that we might not again subject that most precious of our Asiatic colonies to the fate it endured in the 17th century. Manchuria is not a neighbour like the Central Asiatic Khanats. We may expect great danger from that quarter." The question to which Colonel Veniukof has now drawn the special attention of his Government, has not, indeed, been neglected. A commission appointed to examine and to report upon the condition of that frontier line, has recommended many important measures, such as the removal of the centres of administration of the naval power to more commanding sites, and measures have been adopted which are calculated to induce Russians, and even natives adopting Russian nationality, to occupy the vacant lands on the Ussouri. The Cossacks, who were a plague, and even a source of danger, to everybody in the cities of Russia, have been sent out of the country in large bodies to find congenial occupation in Central Asia, and in the remote East. Their barracks now line the Ussouri and the seaboard of the Pacific, and these men, emulating the deeds of Khabarof, and other of their ancestors, invade with impunity the hunting-grounds of Daùria, and other ermine-stocked hill districts of Manchuria.

It remains now for the Russians to carry their point with regard to the right of ascending the Sungari, which has been always denied to them. Without doubt, however, the time is approaching, if it has not already come, with a pause in Central Asian advances, for settling this vexed question. For an increase of power on the Yellow waters will assuredly bring with it corresponding advantages. With a seaboard like that of the Sea of Japan, the acquisition of territories in the rear, with a view merely to insure inviolability, security, tranquility, repose, and all the other ingredients of happy possession, is one of the inevitable consequences of circumstances over which one has no control.

We propose in our next to deal with Colonel Veniukof's "Essay" on the Trans-Baikal or Khalka (Mongol) Section of the Russian Imperial frontier in Asia.

ROBERT MICHELL.

Tury-Rog or Voronej, on a spur of the hills at the north-east extremity of lake Hankai. It consists of thirty-two houses with 241 Russian inhabitants. Mr. Prjevalski, who passed nearly two years in that part of the Ussouri country in zoological and other studies and investigations, read a paper on the subject at a meeting of the Russian Geographical Society at St. Petersburg in 1870, in which he gave a glowing description of the beauties and capabilities of the maritime region. In this paper Mr. Prjevalski mentioned the discovery made by him in the ruins of two ancient forts on the rivers Chagny and Tundogir, not far from the Suifun River—of sculptured images of unknown beasts of the size of big dogs in red granite, a material which is not found in the mountains of the neighbourhood.

THE GERMAN ARCTIC EXPEDITION.*

IN the April number of *Ocean Highways* for 1873, we reviewed at some length the first volume of the general narrative of the German Expedition to East Greenland, or, as they prefer calling it, the second Arctic Expedition. Thanks to the courtesy of the editors, we have now before us another bulky and handsome volume of 467 pages, which forms the first portion of the systematic account of the scientific results of the Expedition. We have carefully examined it throughout; and, while disappointed in some respects by the comparatively poor results (in some departments) which the naturalists of the party have brought home, and by the manner in which some of the authors of the monographs contained in the volume treat the subjects entrusted to their care, take it as a whole, the volume, so far as it goes, is an admirable contribution to Arctic Natural History, and reflects credit on its eminent authors, and on the Bremen Society for Northern Exploration with whom the Expedition originated, and under whose fostering care the narrative of its discoveries is being published. It may be useful to examine the contents of the volume a little more in detail, more especially as the students of Arctic Natural History are, in England at least, so few that the value of the collections described may not be so thoroughly appreciated as they deserve to be.

The first portion of the book is occupied with the botany of the Expedition, edited by Professor Buchenau, of Bremen. After a few introductory pages by Dr. Adolf Pansch, of Kiel, one of the members of the Expedition, on the climate and plant life of East Greenland in general, Drs. Buchenau and Focke in a monograph of 50 pages, describe the flowering plants, ferns, and fern-allies brought home. The list seems meagre, comprising in all, and including some very dubious species, only eighty-nine. On the opposite coast, while occupied with many other duties, we obtained in little more than two months, about 120 species. The list given in this narrative comprises no new species, though it adds somewhat to our very imperfect knowledge of the flora of East Greenland. As showing the general nature of it, we select the list of species found on Sabine Island, one of the most northern localities in the list:—*Ranunculus glacialis, R. nivalis, Papaver nudicaule, Cardamine belliditolia, Draba arctica, D. Wahlenbergii, D. alpina, D. muricella, Cochlearia* sp., *Silene acaulis, Wahlenbergia apetala, Melandrum affine, M. triflorum, Arenaria ciliata, Alsine rubella, A. biflora, Stellaria longipes, S. humifusa, Dryas octopetala, Potentilla nivea, P. emarginata, Epilobium latifolium, Saxefraga oppositifolia, S. cæspitosa, S. cernua, S. nivalis, S. Herculus, S. flagellaris, Taraxicum phymatocarpum, Campanula uniflora, Vaccinium uliginosium, Andromeda tetragona, Polemonium humile, Pedicularis hirsuta, Armeria maritima, Oxyria digyna, Polygonum viviparum, Salix arctica, Luzula hyperborea, Juncus biglumis, Carex fuliginosa, Eriophorum polystachyum, Alopecurus alpinus, Hierochlæ alpina, Catabrosa algida, Festuca vivipera, Poa arctica, P. cæsia, Equisetum scirpoides,* and *E.*

* *Die Zweite Deutsche Nordpolarfahrt in den Jahren,* 1869 *und* 1870 *unter führung des Kapitän Karl Koldewey.* Herausgegeben von dem verein für die Deutsche Nordpolarfahrt: Zweiter Band; Wissenschaftliche Ergebnisse. (Leipzig, F. A. Brockhaus, 1874).

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arvense v. boreale (Bongard). The East Greenland flora, while poorer than that of the west coast, —judging from these collections—has thus a more European type. Professor Karl Müller, of Halle, next takes up the mosses, recording seventy-one species, including two new species, viz., *Grimmia Panschii* C. Müll., and *Gümbelia arctica*, C. Müll. The lichens, annotated by Professor Körber of Breslau, show a poor array of fifty-two species out of the between 300 or 400 which are known to be found in Greenland. Ten new species are recorded, viz., *Gyrophora Tramnitziana*, Kbr.; *G. Koldeweyi*, Kbr.; *Calopisma mydaleum*, *Rinodina Panschiana*, Kbr.; *Aspicilia rosulata*, Kbr.; *Buellia Copelandi*, *Buellia Payeri*, Kbr.; *Lecidella hansatica*, Kbr.; *Rhizocarponinops*, Kbr.; and *Orphniospora grœnlandica*, Kbr.; the type also of a new genus. Here again the species collected on the shores of the opposite Disco Bay, on the west coast, are more than double in number, and excel it in novelties also, as recorded by Dr. Lauder Lindsay, in his treatise on the lichens collected by the writer of this notice. (*Linnean Transactions*, vol. xxviii.)—a work which though mentioned by Professor Körber, does not seem to have been studied by him. Oberfinanzrath Zeller, of Stuttgart, describes the *Algæ* brought home. They are all well known Arctic and Northern forms, and seem to show either that the regions visited by the Expedition are poor in species, or that this branch of botany was not fortunate enough to attract many collectors; for, including some species collected in South Greenland by the officers of the 'Hansa,' on their way home, after the loss of that ill-starred vessel, the list only reaches seventeen. Herren Bonorden and Fuckel describe the fungi which, notwithstanding the northern latitude, and the difficulty of preserving them for proper identification, are enumerated to the extent of about twenty species—several of which are described and figured as new. Professor Gregor Kraus, of Erlangen, devotes an elaborate monograph of thirty-four pages to an examination of the pieces of driftwood picked up by the Expedition. While recognizing the learning and industry of the eminent microscopist named, we cannot help thinking that this is "breaking a butterfly on a wheel," and that the whole is a piece of laborious trifling. There can be but little doubt that the driftwood found on the East Greenland coast comes almost entirely from the mouths of the Russian and Siberian rivers, and is carried over to the East Greenland coast, and thence round Cape Farewell up to about latitude 70° by the "Spitzbergen stream." Even did the fact admit of much doubt, it is impossible to make out the species of trees from which the worn pieces of driftwood came, by microscopic or other examination. The order, and even in some cases the genus, may be made out, but the allied species of different genera cannot be characterised by the form of the fibres, and the arrangements of the discs on them. To theorize regarding the currents, from such data, would be rash in the extreme. The same may be said regarding the value of another essay by the same writer, on the growth of some of the East Greenland woody plants—in which we find careful measurements of their stems, annual growths, &c. It is not without value, but is elaborated to an extent which the interest of the subject does not justify. This concludes the botany of the Expedition —137 pages in all. We turn to the zoological section, which opens with a brief introduction by the eminent ornithologist, Dr. Otto Finsch, of Bremen, to whom has been entrusted the subediting of this portion of the work under review. In all fifteen monographs are devoted to the animals collected by the Expedition, chiefly by Dr. Pansch, aided by Dr. Copeland, an Englishman naturalized in Germany, and now Lord Rosse's astronomer at Parsontown (Obersteurmann), and the first mate Lengstake. Dr. Pansch leads the way with a short essay on the anthropology of East Greenland. The Expedition met with no natives, though with frequent traces of them—mostly, however, of old date. In all likelihood there are now few natives on this ice-bound coast, most of them having removed to the south. Almost every year some wild-looking denizens of the regions to the eastward of Cape Farewell, come into one of the Danish southern settlements on the west coast, and stay there. A party who arrived some years ago declared that it was two years since they had left their homes in the far north. The glaciers of Melville Bay keep the kayak-less handful of natives now living in Smith's Sound from reaching the South; but there is no such obstacle to prevent the natives of the east coast from reaching those havens of plenty which they must all long ere this have heard of, in rumour at least, as existing in the milder and more genial region to the westward of "Umanarssuak" (Cape Farewell).* Most of Dr. Pansch's essay appeared in English, a few years ago, in *Fraser's Magazine*. Professor Peters, of Berlin, describes the mammalia and fishes of the Expedition. The first number fifteen species, and Professor Peter's remarks require no special notice, except that he does not altogether seem *au fait* in the recent literature of Arctic Mammology. We note, however, three remarkable animals in his list, viz., the musk ox, the lemming, and the ermine. The latter animal is entirely new to the Greenland fauna, and is another proof of the European character of the east coast zoologically as well as botanically, though curiously enough the species is made out to be *Mustela erminea* var. *putorius novaeboracensis* of Dekay (*Mamm. of North Am.* 1859, p. 166). Two specimens were obtained, and the traces of several others observed. The musk ox is a well-known Arctic animal, but is quite unknown to the fauna of West Greenland south of Wolstenholme Sound, the skull which Fabricius records in his *Fauna Groenlandica* as being found in East Greenland (and which he thought to be that of the yak) having in all probability drifted in ice from the north, for it is now known to exist on the Greenland shores of Smith's Sound. Kane heard traces of the animal; Hayes saw it; while the late American Expedition to that region saw twenty-six in latitude 81° 38' north. Again, it has never been heard of on the south-eastern coast; but no sooner do we come to the east coast about opposite Wolstenholme Sound, than it appears in abundance, pointing to an extraordinary distribution of that member essentially of the American fauna. On Sabine, Pendulum, and Shannon Islands it was seen in herds of ten to twelve. Now it could never have crossed (in modern times at least) from Smith's Sound, over the ice-covered interior of

* See Klemschmidt's "Sinerissap Kavdlunâkarfiligtâ," the Eskimo map of Greenland.

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Greenland. We are, therefore, almost forced to the conclusion that it must have found its way to the eastward by the northern shores of Greenland. At all events the presence of this animal in high latitudes on either side of the country, and yet not stretching to the south, is a remarkable fact in zoo-geography, and capable of giving rise to curious speculations. The lemming *(Myodes torquatus)* is also an interesting animal, though not so remarkable as the musk ox in its distribution. It was originally found, in 1823, on the east coast of Greenland, by Scoresby, and until recently his specimen was unique. It is in the Edinburgh Museum, where it was examined and identified by the writer in 1868 (see "Mammals of Greenland," *Proceedings of Zoological Society*, 1868); but it has never been found on the west coast. It is another member of the European fauna, though the species is identical with the Siberian one, again most probably only a variety of the European form. If the Americans have found it in Smith's Sound, then it adds, with the musk, a second anomaly in the geographical distribution of the Greenland fauna. The other mammals are the polar bear, the polar fox, the walrus, the saddle-back seal, the bearded seal (the ground seal of the English sealers), the bladder-nose seal, the Arctic hare, the reindeer—but whether the Greenland or European form, Dr. Peters unfortunately fails to record—the right whalebone whale (seen at a distance), the finback *(Balænoptera boops)*—doubtfully observed, the narwhal, and the bottle-nose ("Grinddeiphin," *Hyperoodon* sp. ?). Six species of fishes are only recorded, but one of them Dr. Peters makes out to be a new species of *Gadus (G. glacialis*, Ptrs.) from Sabine Island. The salmon he thinks *S. Hoodii*. This we would think rather doubtful, as *S. Hoodii* is an American species, and as the specimens on which this doubtful identification was made were both young, there is reason to think that they may be one or other of the five known salmon already described from Greenland. Hermann von Nathusius contributes some notes on the Eskimo sledge dog; while Drs. Finsch and Pansch describe the birds brought home. Thirty-one species in all are annotated, but none are of much importance—though the notes on their plumage, especially that of the ptarmigan, are of interest and value. Our own Professor Newton, of Cambridge, contributes notes on the eggs collected. No one is better fitted for the task, and none could have performed it better. Two species of Tunicata are described by Professor Kupffer of Kiel—one of them *(Cynthia Adolphi)* being new. The Mollusca Annelida, Echinodermata and Cœlenterata are described by Professor Möbius of Kiel. Of mollusca there are twenty-two species, but none new. Of worms, free and parasitic, eighteen are described, including *Leipoceras*, a new genus, comprising one species *(L. uviferum)*. The Echinodermata comprise one sea cucumber, a sea urchin, and four starfishes—all known before. Lastly, the Cœlenterata proper are two in number. The Crustacea, to the number of fifty-eight, are elaborately monographed by Dr. Buchholz, of Greifswald. This is perhaps the best portion of the volume before us. Six new species are described, viz., *Hippolyte incerta*, *H. Panschii*, *Pasiphaë glacialis*, *Leptophryxus mysidis* (new genus), *Parapleustes glacialis* (new genus), and *Paramphithoë megalops*, besides many rare or interesting forms.

The Arachnida have been committed to the competent hands of Dr. L. Koch, of Nürnberg. His task has not been an extensive one, for only one species was found amid the East Greenland snows, and that a new one *(Lycosa aquilonaris*, Koch*)*. The Hymenopterous and Dipterous insects are catalogued by Dr. Gerstäcker, of Berlin, with notes by Dr. Pansch. The Hymenoptera are three in number, while the Diptera are four; all the six species being well-known European forms. The Lepedoptera, catalogued by Alexander von Homeyer, of Schweidnitz, are six in number—one *(Dasychira groenlandica*, Wocke*)* being new to science. The Hydrozoa and Polyzoa are described by Dr. Kerchenpauer, of Hamburg. Of Hydrozoa there are four species, one being perhaps new. The species of Polyzoa are twenty-six in number, only one *(Hemeschara contorta)* being new.

The sponges are described by Professor Schmidt of Strasbourg, and Ernest Haeckel of Jena. They are eight in number—six being new, though rather imperfectly characterised by Dr. Schmidt, into whose division of work they have fallen—owing, however, it is just to mention, to the imperfect specimens entrusted to him.

Lastly, the veteran Ehrenberg describes and figures the microscopic animals and plants found in the soundings taken up by the Expedition. Nineteen beautiful plates, on stone and copper, illustrate the book, and, take it all in all, it is a noble work, worthy of the nation which despatched the Expedition, and one which must always be consulted by every student of Arctic zoology. It shows, moreover, how much is yet to be done in Arctic Natural History, by an expedition which—as in the case of the German one—numbered among its members properly trained and equipped naturalists. One word before concluding is due to the editors of this volume, Herren Moste and Albrecht, as well as to the scientific editors, Drs. Buchenau and Finsch. They have performed their difficult and delicate task of superintending the labours of so many eminent men working in different fields most judiciously and well; and we doubt not but that the next and concluding part of the scientific section of the work—geology, meteorology, hydrography, astronomy, geodesy, and terrestrial magnetism—will be performed in an equally satisfactory manner.

ROBERT BROWN.

DAHOMEY AS IT IS. By *J. A. Skertchly*. With Illustrations. London (Chapman and Hall), 1874.

THERE is an apparent—perhaps unconscious—satire in the title of this book. As lately as 1864 we received a mass of information respecting Dahomey from the pen of Captain Burton. The title of Mr. Skertchly's book seems to denote that he is anxious to paint the country as it is, and not as it is said to be; but in most respects the author bears willing witness to Captain Burton's accuracy, and his accounts pretty generally confirm our previous notions of Dahomey.

The object Mr. Skertchly had in travel was the collection of zoological specimens. With this view he attempted to explore the fauna of Whydah and its neighbourhood; but an invitation for eight days from Gelele, the king of Dahomey, induced him to travel up country to Kana. Here he was detained for eight *months* by the king, his Majesty being evidently desi-

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rous of establishing a better reputation in England through the medium of Mr. Skertchly's pen. Although in several places the author censures the exaggerated accounts about Dahomey which have been circulated in this country, his general description will not fascinate readers. Above all, the human sacrifices, which amounted to eighty in number during his stay, are told with an amount of circumstance and detail which may perhaps be instructive, but are certainly sickening. The endless repetitions of ceremonies, too, are rather monotonous.

The following story respecting the thieving propensities of the natives is, however, too amusing to be passed over.—The negroes are very fond of anointing their bodies with fat, and to that end they will not scruple to steal the coveted grease. On one occasion on board the 'Astarte' it was discovered that the canoe men had been stealing the cook's fat. But a Nemesis was at hand. A pot of hot varnish stood close to the galley door, and the negroes spying this "fat" out, commenced to besmear themselves with the precious liquid. On returning to the vessel their passage along the sandy beach had converted them into as pretty a group of "asphalted" negroes as one could wish to see, and the drying of the varnish had been productive of anything but comfort. They never stole any more "fat."

We must not omit to notice some thoughtful remarks on the mental and social position of the negro, which corroborate the accounts furnished by Burton, Baker, and others. The volume is illustrated by some fair sketches of the author's taking.

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PETERMANN'S MITTHEILUNGEN.

EXPLORATION OF THE OLD BED OF THE OXUS.

IN the early part of July, 1873, a detachment under the guidance of Colonel Glukhofsky, set out from Khiva to Kunia-Urgenj, to investigate this interesting physical feature of the Trans-Caspian desert. From Kunia-Urgenj they followed the old bed for a distance of 200 versts, as far the Sary-Kamysch Lake. At the Dektcha Wells a junction was effected with the Caucasus surveys, which in 1871 were extended across the Ust-Urt. Colonel Stebnitzky had surveyed the old river bed from its mouth in the Balkhan Gulf for a distance of 281 versts, as far up as the Igdy Wells. The intervening part, which has not been examined, thus lies between Igdy and the Sary-Kamysch Lake, and is only about 200 versts in extent.

Glukhofsky's survey resulted in several interesting discoveries. The old river originally flowed in two channels now dry, called respectively Laudan and Kunia-Daria; the former being the shorter of the two. The Kunia-Daria winds about considerably between Kunia-Urgenj, and the Sary-Kamysch Lake. Its breadth averages about 1400 feet, and in many places the depth amounts to 120 feet. It is worthy of notice that the elevation of the bank on the right, and not on the left side, proves that the body of the current must have swept along the former side. Wells, varying from 5 to 20 feet in depth, have been dug at intervals of about 4 versts, and the water obtained is fresh; but as one nears the Aibugir Gulf of the Sea of Aral it becomes salt. The bed of the Urun-Daria is sandy; but in spite of this the climate is so moist, that all along its banks there grows a profusion of tamarisks, brambles, and other vegetation. Southwards, the country is sheer plain, but to the north, the edge or "chink" of the Ust-Urt plateau abuts on the plain. The Urun-Daria ends in the Sary-Kamysch Lake, which really consists of two lakes united by a small channel. There are well-defined traces of the banks having originally existed at a considerable distance outside of their present position.

A most interesting feature is the traces of former irrigation. The heads of numerous canals often 150 feet in breadth, are observable, and these served to feed smaller canals which conveyed the precious water off for the benefit of the corn-fields and gardens. This with the frequent ruins of towns and villages proves that agriculture once flourished and enriched the country. The ruins, however, are of those of two distinct periods. the earlier, strange to say, denoting a much higher civilization than the latter, which do not differ in character from the present dwellings of the Khivese.

Kunia-Urgenj was once the chief town of commercial importance in Khaurezm, and a trading mart between Europe and Asia. It was destroyed by Timur-Leng in 1388, and, though rebuilt, plundered by Ural Cossacks in 1603, and again destroyed towards the close of the 17th century by Aëomka, Khan of the Calmuck Tartars. The most conspicuous ruin is a tower of conical shape about 200 feet high, built of brick and covered with inscriptions. The summit is reached by an interior winding staircase.

Another building of interest, and still in tolerable preservation, is a summer palace of some former khan. It consists of a number of circular walls with vaulted roofs, lighted by two rows of casemates, the interior being most artistically decorated with relief arabesque work in gold and bright colours.

The ruins of Deu-Kissken, on a slope of the Ust-Urt, claim attention for the bold curvature of the arches, domes, &c., and their general massive character. The bricks used in the construction of the buildings are all of uniform shape, about a foot square: they are made with great care, are extremely durable, and give a metallic sound on being struck.

Colonel Glukhofsky and his officers came to the conclusion that no great engineering difficulty existed in the way of the water of the Oxus being conveyed back as far as the Sary Kamysch Lake, but whether it can be enticed into its old bed as far as the Caspian, can only be decided when the remaining 200 versts have been surveyed, and a complete series of levels carried along the whole length of the channel, down to the Balkan Gulf.

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EL DEPARTAMENTO DE ANCACHS Y SUS RIQUEZAS MINERALES. Por *A. Raimondi.* Publicado por Enrique Meiggs. Lima, 1873.

THIS handsome volume is the first fruits of the great statistical survey of Peru undertaken by Don Antonio Raimondi, under the auspices and at the expense of the Peruvian Government. Its early publication is, however, due to the public spirit and liberality of Mr. Meiggs, the great contractor. The first part treats of the geography and topography, the second of the geology, and the third of the mineral wealth of this important department of Ancachs. Every branch of statistics, in the widest acceptation of the term, is treated of, first with regard to the whole department, and then, in more detail, in dealing with each Province. A very remarkable feature in the physical geography of this part of Peru is the "Callejon de Huaraz," the long lateral valley between two chains of the Andes, watered by the River Santa, and at the northern extremity of which the river breaks through the mountain barrier, and dashing down a stupendous gorge, reaches the plain on the sea coast. This geographical feature is well described, and it is interesting as presenting an analogy to similar lateral valleys, such as those of the Indus and the Sutlej in the Himalayas. While this gazetteer of the Peruvian department of Ancachs is equal in all respects to those which have recently appeared in India, for instance those of the Central Provinces of Madura and Bellary; it is superior in several. It is printed on better paper, and with better type, and is illustrated by an admirably engraved map, which has been prepared with great care. We very heartily congratulate the Peruvian Government on the publication of this meritorious work, the first of a noble series which will, at last, furnish accurate knowledge of the topography and statistics of the land of the Yncas.

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Bibliography.

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HISTORY OF GEOGRAPHY.

VIVIEN DE SAINT-MARTIN, l'année géographique, revue annuelle des voyages de terre et de mer, des explorations, &c., 1873. 18mo., pp. 510. Paris, 1874. 3s.

GOODRICH (F. B.) Remarkable Voyages; or, Man upon the Sea. A History of Maritime Adventures, Explorations and Discovery from the earliest ages to the present time. Illustr. New ed. Philadelphia, 15s.

DAVILLIER (Ch.) Mémoire de Velásquez sur 41 tableaux envoyés par Philipe IV. à l'Escurial. Reimpression de l'exemplaire unique (1658), avec introduction, &c. 8vo., pp. 64, with plates. Paris, 1874. (Only a limited number of copies printed.)

SYDOW (Colonel Emil von) Ein Nachruf. 8vo., pp. 24. Berlin, 1874. 7d.

REGISTRANDE der Geographisch-Statistischen Abtheilung des grossen Generalstabs, Oct., 1872-73. Map. 8vo., pp. 538. Berlin, 1873. 10s.

SURVEYING AND PRODUCTION OF MAPS.

ENSEIGNEMENT de Geographie. Conférences de cartographie données à l'école normale d'Albertville, 1871. 8vo., pp. 30. Illustr. Chambéry, 1873.

RAY'S Surveying and Navigation. By A. Schuyler. 8vo., pp. 403. Cincinnati. 12s.

ZAFFAUK (Capt. J.) Zeichenschlüssel zum Lesen russischer Karten (in German and Russian). Plate. 8vo., pp. 16. Teschen, 1874. 1s.

HANDBOOKS.

HUMMEL (A.) Handbuch d. Erdkunde. Ein Handbuch d. geogr. Wissens. 8vo. Leipzig, 1874. In parts, at 1s.

VOLK'S Atlas der Geographie. Auf Grund von F. Bromme's Hand Atlas von G. Reuschle, H. Merte u. E. Serth. Fol., 52 maps, pp. 208, woodcuts. Stuttgart, 1874. 39s.

MARTIN (F.) The Statesmen's Year Book for 1874. 8vo. London, 1874. 10s. 6d.

PHYSICAL GEOGRAPHY.

MAURY (M. F.) Physical Geography. 8vo., pp. 218. New York. 12s.

WARREN (D. M.) Elementary treatise on Physical Geography. Revised by A. von Steinwehr. 4to., pp. 114. Philadelphia. 9s. 6d.

LAWSON (W.) Text Book of Physical Geography. 12mo., pp. 380. Edinburgh, 1874. 3s. 6d.

GILPIN (W.) Mission of the North American People, geological, social, and political. With 6 charts delineating the physical architecture and thermal laws of all the continents. 8vo., pp. 47. Philadelphia. 22s.

ULE (Dr. O.) Die Erde u. d. Erscheinungen ihrer Oberfläche, etc., nach E. Reclus. Illustrations and maps. Leipzig, 1874. In parts, at 9d.

VOYAGES ROUND THE WORLD.

SIMPSON (W.) Meeting the Sun: a Journey all round the World, through Egypt, China, Japan, and California. 8vo., pp. 402. London, 1874. 24s.

YELVERTON (Therese) Terisina Peregrina; or 50,000 miles of travel round the world. 2 vols., 8vo., pp. 704. London, 1874. 21s.

WINTER at the Italian Lakes. 12mo., pp. 306. London, 1874. 7s. 6d.

MEREWETHER (H. A.) By Sea and Land, being a trip through Egypt, India, Ceylon, Australia, New Zealand, and America. 8vo., pp. 346. London, 1874. 8s. 6d.

EUROPE.

FULTON (Ch. C.) Europe viewed through American Spectacles. 8vo., pp. 312. Philadelphia, 1874. 9s.

PRIME (S. I.) The Alhambra and the Kremlim. The North and South of Europe. 60 Illustr. 8vo. New York, 15s.

PEAK (Elizab.) Ten Pictures of Europe. Illustr. 8vo., pp. 591. Philadelphia, 1874. 18s.

UNITED KINGDOM.

AGRICULTURAL Returns of Great Britain, with abstract returns of the United Kingdom, &c., for 1873. (Parl. paper, 873, Session 1873.) London, 1874. 5d.

CENSUS of England and Wales, 1871. Vol. iii., containing the ages, civil condition, occupation, and birth-places of the people. (Parl. paper 872, Session 1873.) Fol., pp. 738. London, 1874. 7s. 9d.

FRANCE.

TABLEAUX de population, de culture, de commerce et de navigation, formant pour l'année 1870 la suite des tableaux inserés dans les notices statistiques sur les colonies françaises. 8vo., pp. 209. Paris, 1874.

THOMASSIN, Pilote de la Manche côtes nord de la France. 2e. partie (Ile de Bas aux Héaux de Bréhat). 8vo., pp. 418. Paris, 1874 (Dépôt de la marine.) 4s.

GERMANY.

STATISTISCHE Mittheilungen über Elsass—Lothringen Hsg. v. Stat. Bureau in Strassburg. Part 2. 8vo. (area, statistics of cattle,) pp. 168. Strassburg, 1874. 5s. 6d.

AUGEROT (A. d') Souvenirs d'un voyage à Francfort. 8vo., pp. 140. Illus. Limoges, 1874.

ITALY.

DRIOU (A.) Naples son golfe et ses rivages, excursions du Vesuve, &c. 8vo., pp. 312. Limoges, 1874.

GATTINI (F. Petruccelli de la) Rome and the Papacy. A history of the men, manners and temporal Government of Rome in the 19th century, as administered by the Priests. Translated by R. E. Peterson. 12mo., pp. 317. Philadelphia. 9s.

RUSSIA.

CATALOGUE de la section des Russica, ou écrits sur la Russie en langues étrangères. 2 toms. 8vo., pp. 1614. St. Petersburg, 1873. 24s.

CARRINGTON (Geo.) Behind the Scenes in Russia. 8vo., pp. 240. London, 1874. 7s. 6d.

PROCTOR (E. D.) A Russian Journey. Illus. 8vo., pp. 322. Boston. 12s.

ASIA.

DURET (Th.) Voyage en Asie. Le Japon, la Chine, la Mongolie, Java, Ceylan, l'Indo. 18mo., pp. 374. Paris, 1874. 2s. 6d.

JESSUP (Rev. H. H.) The women of the Arabs. Edited by Rev, C. S. Robinson and Rev. I. Riley. Illus. 12mo., Boston. 10s.

HODDER (Edw.) On Holy Ground; or, scenes and incidents in the Land of Promise. 8vo., pp. 354. London, 1874. 7s. 6d,

HARMAN (Rev. H. H.) A journey to Egypt and the Holy Land in 1869-70. 8vo., pp. 332. Philadelphia. 8s. 6d.

TAYLOR (A. D.) The India Directory for the guidance of commanders of steamers and sailing vessels. Founded upon the work of the late Capt. J. Horsburg. Part I. (East Indies and adjacent parts of Africa and South America). Charts. 8vo., pp. 7 . London, 1874. 38s.

LETTERS from India and Kashmir, written 1870. Illustrated and annotated in 1873. 8vo., pp. 252. London, 1874. 31s. 6d.

CORBETT (A. F.) The climate and resources of Upper India, and suggestions for their improvement. 8vo., pp. 104. London, 1874. 5s.

FRERE (Sir Bartle C.) On the impending Bengal Famine: how it will be met, and how to prevent future famines in India. Maps. 8vo., pp. 120. London, 1874. 5s.

AUSTRALASIA.

CENSUS of New South Wales for 1871 (Ages, religion, nationality, education, social condition, and occupations.) Fol., pp. 1326. Sydney, 1873. 20s.

BLUE BOOK for the year 1873. Compiled in the Registrar General's Office, and ordered by the Legislative Assembly to be printed. Fol., pp. 134. Sydney (New South Wales), 1873. 3s. 6d.

JOHNSTONE (Capt. J. C.) Maoria: a sketch of the manners and customs of the aboriginal inhabitants of New Zealand. 8vo., pp. 214. London, 1874. 7s. 6d.

ST. JOHN (Col.) Pakeha Rambles through Maori Lands. Map. 8vo. Wellington, New Zealand. 187 . 16s.

STODDARD (C. W.) Summer cruising in the South Seas. Illustrated by W. Mackay. 8vo., pp. 314. London. 1874. 7s. 6d.

BLISS (W. R.) Paradise in the Pacific: a book of travel, adventure and facts in the Sandwich Islands. 16mo., pp. 207. New York. 6s. 6d.

NORTH AMERICA.

CHARLEVOIX (Rev. P. F. X.) History and general description of New France. Translated by J. G. Shea. Maps, portraits and facsimiles. 6 vols. New York. £12 12s.

WATSON (S. J.) The Constitutional History of Canada. Toronto, 1873. 7s.

MILES (H. H.) The History of Canada under French Régime, 1535-1763. Maps. 8vo., pp. 548. Montreal, 1872. 14s.

ANNUAL REPORT on the Commerce and Navigation of the United States for 1868. 8vo., pp. 145. Washington. 30s.

BYRNE (Rev. S.) Irish Emigration to the United States. Map. 12mo., pp. 165. London (Trübner), 1874. 6s. 6d.

REPORT of the Commissioners of Education for 1873. 8vo., pp. 1156. Washington. 30s.

RAYMOND (R. W.) Silver and Gold: an account of the Mining and Metallurgical Industries of the United States. 8vo., pp. 556. Plates. New York. 18s.

RAYMOND (R. W.) Statistics of Mines and Mining in the States and Territories west of the Rocky Mountains, for 1873. 8vo., pp. 566. Washington, 1873. 14s.

HENRY (J. T.) The Early and Later History of Petroleum, with authentic facts in regard to its development in Pennsylvania, &c. 8vo., pp. 607. Philadelphia. 22s.

ARCTIC REGIONS.

MARKHAM (A. H.) A Whaling Cruize to Baffin Bay and the Gulf of Boothia, and an account of the rescue of the crew of the 'Polaris.' 8vo., pp. 336. London, 1874. 18s.

HERR (O.) Die Schwedischen Expeditionen zur Erforschung d. hohen Nordens, 1870-73. 8vo., pp. 46. Zürich, 1874. 1s. 6d.

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Cartography.

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Maps of India.

THE last parcel of new maps received from India is not as bulky as on some former occasions, but offers nevertheless several features of interest. It is gratifying, above all things, to be able to announce the publication of three new quarter sheets of the Indian Atlas,* for the scale and small cost of that work place it most readily within the reach of persons interested in Indian geography.

Quarter sheet 9, S.W,, is from surveys made by Capt. J. MacDonald, Mr. W. Lane, and assistants, and embraces a portion of Khyrpoor (we retain in all cases the nomenclature of the maps, which in a good many cases, openly sets at defiance the orthographic edicts of the Government of India) and presents us with a region of sand-ridges with the features of which we have lately become familiarised through the sheets of the Sind Revenue Survey. The hills delineated on the sheet before us do not, however, present any of those peculiarities in their shape and direction which characterise those so ably described by Sir Bartle Frere in vol. xl. of the *Journal of the Royal Geographical Society*. Quarter sheet, 51 S.W., from surveys by Captains A. B. Melville, G. Strahan, and others, includes part of the country above the junction of the Parbati and Chambal rivers. There is some neat hill work upon it, and a remarkable semicircular ridge near the former of the two rivers named has attracted our attention particularly. Sheet 34, N.E., from surveys by Lieut. D. C. Vanrenen, Captain Strahan, and others, gives part of Ajmeer, but has been issued preliminarily, not being as yet quite finished.

The 1-inch maps of the Revenue Surveys have been increased to the extent of 5 sheets. Three of these refer to the district of Gonda in Oudh†, and are from surveys made in 1868-71 by Major F. C. Anderson and assistants. These maps are exceedingly minute, and abound in detail, but we regret not having been able to discover a single altitude upon either of them, which even in a level country would prove of value. The two other sheets of the Revenue Survey concern the district of Omomerkot‡ in Sinde. They are from surveys made by Mr. Lane in 1862-5, and like so many preceding sheets, they are covered with those endless ridges of sand hills, the delineation of which must have proved sorely troublesome to our Indian surveyors.

The additions to the one-inch maps of the Topographical Survey are even less numerous than those made to the Revenue Survey. The new sheet of that puzzle, the Ganjam and Orissa Topographical Survey,§ is from surveys made as long ago as 1858-61, by J. O. Nicolson and assistants.

The new sheet of the survey of the Central Provinces and Vizagapatam,‖ is by Colonel Paxton (1860-61 and 1870-71). To Lieutenant W. G. Murray we are indebted for an additional sheet of the Rewah Survey,¶ upon which the edge of the plateau bounding the Tamas and Beylund Rivers to the south is characteristically delineated; and that old and meritorious officer, Captain G. Strahan, with Mr. Hörst, has supplied us with a sheet of the Rajpootanah survey (1871-2),** the most remarkable feature upon which is the dry and wide bed of the Banas.

The officers of the "Topographical Survey" have furnished, in addition to the above, eight sheets of a large plan of Simla and Jutog,* which will be completed in twenty sheets if the plan laid down on the preliminary index-map is ultimately carried out. This survey, for which we are indebted to Captain G. Strahan, Mr. Hörst, Mr. W. Stotesbury, and Mr. F. Warde, and which was made in 1871-73, is being published in two editions, on scales of 24 inches and 16 inches to the mile respectively, but both produced by photo-lithography from the same original drawing. The map on the smaller scale is very clear; every detail stands out distinctly, and we cannot help thinking that the 24-inch map might have remained unpublished. There is no doubt that it is useful to possess surveys of certain localities on so large a scale, but in all these cases the hills should be shown by horizontal and equidistant contours, instead of by the stiff and conventional contouring applied to the map before us. The index to this survey offers more than we have a right to expect from it, for it contains a table of heights and a long list of names.

The district of the Pachmari Sanitarium, which lies at an elevation of 3481 feet above the sea, has been surveyed, in 1871-2, by Mr. W. Lane, and published on a scale of 1 inch to the mile.† There is an attempt made in this case of shading the hills in a characteristic manner, but it is successful only to a certain extent. In fact, horizontal contours ought to be laid down on every map published on so large a scale, even if it be only approximately, for such contours are the only trustworthy guide for a correct delineation of the ground. If horizontal contours are introduced and a scale of shading adopted and rigidly adhered to, there may certainly be a failure as regards artistic treatment or with respect to details, but the general features are sure to come out correctly. The officers in charge of the Indian Survey have at all times exhibited such zeal in the performance of their task, they have ever been anxious to improve their work to the utmost of their power, and we therefore trust that this question of contouring will engage their attention with a view to its introduction. By adopting such a ground-work for the delineation of the hills the Indian Survey will at once take its place by the side of the best European Surveys.

The remaining maps mentioned below‡ have been prepared at the office of the Surveyor-General in Calcutta for use during the military manœuvres to be carried on in 1873-4. The map of the district of Banda is a photo-lithographic reduction from the Indian Atlas; the others appear partly to be original compilations, but none of the maps will prove of interest except to military officers attached to the camps of exercise or studying the mimic warfare carried on in their neighbourhood.

Indian Famine Relief Maps. ‖

WE have noticed in the last number of the *Geographical Magazine*, the publication of a Famine Relief Map

* Indian Atlas. Quarter sheets 9 S.W., 34 N.E. (imcomplete) and 51 S.W. Scale 4 miles = 1 in. Calcutta, 1873. 1s. 6d. each.

† Oudh Revenue Survey. Sheets 25, 26 and 27. Calcutta, 1873.

‡ Sindh Revenue Survey. Sheets 48 and 57. Calcutta, 1873.

§ Ganjam and Orissa Topographical Survey. Sheet 8 (old series). Calcutta, 1873.

‖ Central Provinces and Vizagapatam Agency Topographical Survey. Sheet 1 (new series). Calcutta, 1873.

¶ Rewah Topographical Survey. Sheets 10 and 11 (second edition). Calcutta, 1873.

** Rajpootana Topographical Survey. Sheet 42. Calcutta, 1873.

* Topographical Survey of India, Simla, and Jutog. Scale 24 inches to the mile. Sheets 1, 2, 3, 4, 5, 8, 9, and 10. Calcutta, 1873. (To be completed in 20 sheets.)

The same. 16 inches to the mile. Same sheets. Calcutta, 1873.

Preliminary Index to the sheets of the Topographical Survey of Simla. Scale 3 miles to the inch. Calcutta, 1873.

† Pachmari Sanitarium, district Hoshungabad. Scale 4 inches to the mile. Complete in one sheet. Calcutta, 1873.

‡ District Banda and parts of the adjoining districts and native states of Bundelkund, comprising the field of operations for the southern camp of exercise, 1873-4. Scale 4 miles to the inch. Calcutta, 1873. 2s.

Country between and around Kirwee and Kalinjer in the district Banda and the adjoining native states of Bundelkund. For the use of the southern camp of exercise, 1873-4. Scale 1 mile to the inch. Calcutta, 1873. 8s.

The same. Scale 2 miles to the inch. Calcutta, 1873. 3s.

‖ Map of the Rajshahee Division. Famine Relief Map. Scale 8 miles inch. Calcutta (Suveyor-General's Office) 1874. 4s.

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of the Patna Division. Since then we have received maps of the Rajshahee and Bhaugulpoor Divisions, on a scale of 8 miles to the inch, and of the districts of Sarun and Bhaugulpoor on double that scale. These maps are in all respects similar to the map of Patna already noticed. They exhibit the position of the Government grain stores, the centres of charitable relief, the routes for the conveyance of Government grain and the relief works undertaken or proposed, and are exceedingly valuable to all those interested in the disaster which has come upon our Indian fellow subjects.

Map of Jamaica.*

OUR most valuable Map of Jamaica (irrespective of Admiralty Charts) has been that of James G. Hawkins and Charles B. Brown, which is drawn on a scale of 1 : 253,440, and is coloured geologically. This map has now been superseded to some extent by the one prepared by Mr. Thomas Harrison, the Colonial Government surveyor, which is drawn on a scale of 1 : 171,000, shows the boundaries down to those of parishes, the main and parochial roads, railways, villages, and "parish towns," stations, schools, churches, chapels and plantations. There are no hills, but this deficiency it is to be hoped will be supplied on some future occasion. The map has been neatly engraved at Mr. Stanford's establishment, and we trust that the example of the Colonial Government of Jamaica, in publishing a map of this kind, will find imitators in other colonies. The area of Jamaica has been a subject of dispute for some considerable time. In the *General Report of the Census of* 1871 (vol. iv., p. 244), we find it stated to amount to 6400 square miles, and this notwithstanding that the area had been computed several years ago at Perthes' geographical establishment from Hawkins' map, and the result (4251·25 square miles) published in the *Mittheilungen*. On the map before us we find the following statements of area, which we trust compilers of year books and geographies will accept as a final settlement of the question :—

Cornwall	1505¼	square miles.
Middlesex	1920	,, ,,
Surrey	767¾	,, ,,
		,, ,,
Total for Jamaica.....	4193	,, ,,

E. G. RAVENSTEIN.

New Maps.

Generalstabskarte von Preussen. 1 : 50,000. No. 30. (Cöpenick). Berlin, 1874. 5d.

Generalstabskarte von Preussen (General Staff Map of Prussia). 1 : 100,000. No. 106. (Passenheim). Berlin, 1874. 1s.

Messtischblätter vom Preussischen Staate. (Plane table sections of Prussia, surveyed by officers of the General Staff, published by the Board of Trade). Scale 1 : 25,000. Sheets 84 to 87, 99 to 102, 141 to 145, 155 to 159, 169 to 176. Berlin, 1874. 1s. each sheet.

Karte vom Mansfelder Gebirgskreis. (Map of the Mansfeld hill district in the Province of Merseburg.) 1 : 100,000. Eisleben, 1874. 2s.

Erhard, Mapa General de la Republica de Mejico. Paris, 1874.

Map of the Bhaugulpoor Division. Famine Relief Map. Scale 8 miles = 1 inch. Calcutta, 1874. 2s.

Map of the Sarun District. Famine Relief Map. Scale 4 miles = 1 inch. Calcutta. 1874. 2s.

Map of the Bhaugulpoor District. Famine Relief Map. Scale 4 miles = 1 inch. Calcutta, 1874. 2s.

* Map of Jamaica, prepared from the best authorities under the direction of Major-General J. R. Mann, R.E., Director of Roads and Surveyor-General, by Thomas Harrison, Government Surveyor. Kingston (Jamaica), 1873. Scale 1 : 171,000.

Log Book.

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Renewal of Arctic Exploration.—Commander A. H. Markham, R.N., the commander of H.M.S. 'Sultan,' who recently returned from a summer cruise in Baffin's Bay and Prince Regent's Inlet, read a paper on Monday, the 27th, on the renewal of Arctic Exploration, in the lecture theatre in Portsmouth Dockyard, before a crowded naval audience. He gave a most interesting detailed account of the change that steam has caused in ice navigation, and of his own experiences; and furnished the clearest information that has yet been accessible in England, respecting the reports of the officers on board the 'Polaris,' on the character of the ice in Robeson Strait. He also explained the reasons why the Smith Sound route is the one which must be adopted for an Arctic Expedition, and why it is unanimously advocated by all officers who are practically acquainted with the subject. The reception of Captain Markham's paper leaves no doubt of the enthusiastic feeling which prevails in the navy in favour of the renewal of Arctic exploration.

The Seal Fishing.—The 'Arctic,' commanded by Captain Adams, sailed from Dundee on the 28th of last February, and reached the ice on the 21st of March ; and, proceeding to the south-west under steam, passed through very heavy ice. The following has been the take of the Dundee ships :—

	Seals.	Tons of Oil.		Seals.	Tons of Oil.
'Arctic'	9500 ...	100	'Erik'	3100 ...	45
'Ravenscraig' ...	6700 ...	70	'Narwhal'	3000 ...	28
'Esquimaux'	6000 ...	85	'Polynia'	1650 ...	28
'Active'	4200 ...	50	'Intrepid'	1300 ...	15
'Camperdown' ..	3300 ...	48	'Victor'	450 ...	10

In addition to the Dundee vessels, there were about thirty foreign ships at the edge of the ice, some of which were successful, while others had not secured a single seal. Of the Peterhead vessels :—

	Tons.		Tons.
'Hope'	45	'Jan Mayen'	25
'Eclipse	35	'Windward'	20
'Labrador'	30		

The weather was generally very foggy, and the ice thin, so that the men frequently fell through. Two men belonging to the 'Camperdown' were drowned.

To all appearance, in the opinion of Captain Adams, the seal fishing is year after year becoming less hopeful and, of course, less remunerative. Owing to the great extent to which the seal fishing is prosecuted by vessels belonging to Scotland and foreign countries, the seals are gradually becoming scarcer, and the packs now met with are not at all to be compared with the very large proportions of the packs which might have been seen years ago. If the seal fishing is to be made really productive, the owners of seal-fishing vessels, in the opinion of Captain Adams, must protect the seals by observing a close season ; otherwise the neglect of this will work its own cure. The propriety of observing a close season has several times been suggested, and it seems to be now more necessary than ever.

Scientific Investigation of the Northern Seas.—The Norwegian project of Professor Mohn,

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of Christiania and M. Sars, for the scientific examination of the sea between Norway, Faroe, Iceland, and Spitzbergen has been very favourably received by the Government. The scheme has been submitted for practical suggestions to the Norwegian Admiralty, the University, and the Chambers of Commerce of the principal commercial towns. The scheme will be presented to the Storthing of 1875, in order to obtain the necessary grant of money.

Reward for Tidings of the Austrian Arctic Expedition.—Count Wilczek, the Austrian traveller, has announced his readiness to give a reward of a thousand florins (100*l.*) to any one who will bring home any news of the Austro-Hungarian Arctic Expedition. The 'Tegethoff' steamer, with the members of the expedition on board, was last heard of on the 21st of August, 1872, off the north-western coast of Novaya Zemlya, in about 76° N. latitude, when Count Wilczek himself parted company with them and sailed southward in his yacht 'Isbjörn.' The 'Tegethoff' intended to push along the northern coast of Siberia, and return before the end of three years (for which period they were provisioned), by way of Behring's Straits; but nothing has been heard of her, and Count Wilczek hopes by promise of the above reward to spur on some hardy British or Norwegian whaler or seal hunter to the search. If, as has been suggested, the expedition found itself compelled to enter in Novaya Zemlya, traces of this might easily be found, and the reward will be equally forthcoming for this discovery. We commend the above to the notice of the Dundee and Peterhead press.

Paris Geographical Congress, 1875.—At the approaching Geographical Congress, to be held in Paris in the spring of next year, all foreign societies are invited to send representatives, and all geographers and travellers of note are earnestly solicited to attend. The Congress will be divided into six groups, viz., mathematical geography, including terrestrial and marine surveying; physical geography and meteorology; historical geography and ethnology; economical and statistical geography; the teaching and diffusion of geographical knowledge; and, lastly, explorations and travels. The different sections or groups will be under the superintendence of names well known in each particular branch, and the Congress itself will be under the presidency of Admiral le Baron de la Roncière le Noury. There will also be an exhibition of apparatus and appliances bearing on the study of geography, and prizes will be adjudged for the most meritorious of these.

The Council of the Royal Geographical Society, appreciating the importance of this event, have appointed a committee, consisting of Lord Houghton, Admiral Ommaney, and Mr. Francis Galton, to consider and report upon the best means of co-operating with the promoters of the Congress.

The Hydrographic Commission of the Amazon.—Admiral Tucker, of the Peruvian Navy, has submitted a most interesting report on the proceedings of the Commission over which he presides, in exploring the tributaries of the Amazon, dated at Yquitos on December 16th, 1873. Two steamers, the 'Tambo' and 'Mayro,' having been placed under his orders, he embarked on the 17th of September, with Lieutenant Rochelle, Surgeon Galt, and two other officers, on board the 'Tambo,' with a chronometer and other instruments. Lieutenant Butt commanded the 'Mayro,' and was ordered to explore the river Nanay. The 'Tambo' went down the Amazon, to commence work at the Brazilian frontier. Admiral Tucker remained for some days at the mouths of the Yavari, to fix their position exactly. Astronomical observations were then taken at various points along the main stream, between the Yaravi and Yquitos. Having returned from the Nanay, the 'Mayro' left Yquitos again on the 27th of October, to explore the rivers Morona, Potro, Pastaza, and Tigre. The 'Tambo' also ascended the main stream to a point called "Punta-Achual," above which the navigation becomes difficult. In the latter part of December the 'Tambo' ascended the river Huallaga, determining the position of Yurimaguas, and other important points. On the 29th, Admiral Tucker arrived at Rumi-Callarina, which he considers to be the furthest point for steamers. He fixed its astronomical position with great care. A road is being constructed from Tarapoto to Rumi-Callarina, which does not present serious engineering difficulties. The banks of the Huallaga are high and free from inundations, so that they are suitable for agricultural enterprises. The 'Tambo' returned to Yquitos on the 6th of December. The 'Mayro' returned from her exploring expedition a few days earlier; after having ascended the river Tigre for 104 miles, and the Morona, Pastaza, Potro, and Itaya for some distance. The following are some of the most important positions that were fixed:—

	South.	W. of Greenwich.
Mouth of the Yavari	4° 18′ 45″	69° 53′ 10″
Loreto	3° 54′ 20″	70° 7′ 45″
Yquitos	3° 44′ 15″	73° 7′ 30″
Mouth of the Yucayali	4° 28′ 30″	73° 21′ 30″
Nauta	4° 31′ 30″	73° 27′ 0″
Punta Achual	4° 15′ 27″	77° 1′ 28″
Yurimaguas, on the Huallaga	5° 51′ 55″	75° 59′ 58″
Rumi-Callarina	5° 58′ 32″	75° 47′ 32″

Very careful observations were also taken of the current at numerous points, and a series of meteorological and hypsometrical observations.

Death of the President of Bolivia.—We regret to announce the death of Colonel Adolfo Ballivian, the accomplished President of the Bolivian Republic, which took place on the 14th of last February. He only entered upon his office on the 8th of May, 1873, having previously been Financial Agent for the Republic in Europe, and Minister to the Argentine Confederation. He was little over forty years of age, and was an enlightened and educated statesman. He is succeeded, provisionally, by Dr. Tomas Frias.

Bolivian Archives.—Don Vicente Ballivian y Roxas, a relative of the late President, has commenced the publication of a most valuable and interesting series of inedited documents relating to the history of Upper Peru—the modern Bolivian Republic. The first volume, which has been published at Paris, contains a diary of the Siege of La Paz, by the insurgent Indians, in 1784, the annals of the town of Potosi, from its foundation to 1702, and a catalogue of printed and manuscript works relating to Upper Peru during the period of Spanish domination. This list has been carefully prepared, and is invaluable to historical or statistical enquirers.

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Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

April 13th, 1874.

DR. LIVINGSTONE.

THE PRESIDENT took the chair at 8.30 p.m. Among those present were Sir George Back, Lord Cottesloe, Sir Walter Stirling, Major Wilson, Sir Robert Peel, M.P., the Hon. C. D. Plunkett, Captain F. Clark, and Colonel Henderson.

The Chairman, on rising, said before they proceeded with the general business of the evening, he was sure they would wish that he should state briefly what had occurred since they last met with regard to that respect they all desired to pay to the remains of the great traveller who had just passed from among them. Since the last meeting those remains had arrived close to the native shores of the deceased, and they were expected to be landed the following morning. Up to the present moment, however, the steamer had not been signalled. Many members of the Royal Geographical Society and of the Council were, therefore, not present that evening, as they had been detained with those who represented Dr. Livingstone's family at Southampton, with the view of receiving the remains as soon as they should be landed. So soon as they arrived they would be brought up to London and duly received, and made over by the order of the Government to the representatives of the family and certain gentlemen selected from among members of the Council to act for the Royal Geographical Society. Colonel Grant, who, as they all knew, was a veteran African traveller; Mr. Horace Waller, an old companion of Dr. Livingstone; and Mr. Hutchinson, representing the Church Missionary Society, and whose servants did such excellent work as companions of Dr. Livingstone during his last travels; joined with Mr. Webb, an old and tried companion of the doctor, were named by the family to represent them, and to be the exponents of their wishes in everything connected with the obsequies of the great traveller. Her Majesty's Government had come forward, he must say, with the most willing spirit, so soon as they knew the facts of the case, to undertake the charge, at the public expense, of the funeral of Dr. Livingstone, and they requested that the Committee of the Royal Geographical Society and those who had been named by the family to represent them, would take charge of the details of the funeral and act on behalf of the Government. They had also placed a sum at the disposal of the Royal Geographical Society, which he trusted would be found sufficient for all purposes. All present, he felt certain, would feel deeply interested to know that the general feeling of Dr. Livingstone's countrymen was well expressed by a merchant of the City of London, who, through Mr. Russell Gurney, volunteered to pay the whole expense of the funeral, whatever it might be. Her Majesty's Government, however, had determined, and he thought everyone would think they had rightly determined, that the expense of the funeral should be borne as a public charge—and Saturday, the 18th, had been selected by the Dean of Westminster as the fittest day for the funeral to take place, and by that time he (Sir Bartle Frere) trusted all the necessary preparations would be carried out. There would, of course, be considerable difficulty in providing accommodation for all those who would wish to be present at the funeral, but he could assure those present that the gentlemen who undertook the management of the matter on behalf of the Fellows of the Royal Geographical Society and those who represented the family would not be wanting in doing all they could to enable not only every member of the Society, but all those who shared their feelings towards the deceased, to show their respect for the great man who had recently departed from amongst them. It was not proposed that evening to do more than to set forth in a very brief manner what had hitherto been done to do honour to Dr. Livingstone's memory. There would be read a letter received from Mr. Holmwood, who was assistant to the Consul-General at Zanzibar, and in which he gave a brief account of what he knew regarding the last travels and days of the illustrious traveller. That account of course was only a brief sketch. He might say, however, that there had been an immense mass of information brought safely to England respecting the labour in which the latter years of his life had been passed, and he had every reason to hope that information would throw ample light upon all his wanderings—their persistent direction towards one great end, and the unflinching courage and perseverance he had displayed towards arriving at that end. He believed that when his literary remains were brought home, laid together, and examined by competent geographical authorities in this country, they would form a monument to his memory such as no traveller for ages past had left him. He would not detain them any further upon that topic. All he regretted was that time did not admit of further debating on what they might expect to hear in greater detail and more perfect form in the course of the session. It was the unanimous wish of the Council of the Royal Geographical Society to embrace the earliest possible moment for collecting all the letters and papers placed at their disposal, in order that they might be available to the public through the *Proceedings of the Society*. A day therefore as early as possible would be fixed on which some of the more prominent papers would be read before the Society. He would now ask Mr. Markham to read the paper from Mr. Holmwood.

Mr. MARKHAM then read the following letter:—

MAJWARA'S ACCOUNT OF THE DEATH OF DR. LIVINGSTONE.

"Zanzibar, March 12th, 1874.

"My dear SIR BARTLE—No doubt you will hear from several interested in Dr. Livingstone; but, as I do not feel sure that any one has thoroughly examined the men who came down with his remains, I briefly summarise what I have been able to glean from a careful cross-examination of Majwara, who was always at his side during his last days; and Susi, as well as the Nassick boys, have generally confirmed what he says. I enclose a small sketch map,* merely giving my idea of the locality, and have added a dotted line to show his route during this last journey of his life.

"The party sent by Stanley left Unyanyembe with the Doctor about the end of August, 1872, and marched straight to the south of lake Tanganyika, through Ufipa, crossing the Rungwa River, where they met with natural springs of boiling water, bubbling up high above the ground. On reaching the Chambezi, or Kambezi River, they crossed it about a week's journey from lake Bemba, also crossing a large feeder; but, by Susi's advice, Livingstone again turned northward, and re-crossed the Kambezi, or Luapula, as he then called it, just before it entered the lake.

"He could not, however, keep close to the north shore of lake Bemba, owing to the numerous creeks and streams, which were hidden in forests of high grass and rushes. After making a detour he again struck the lake at a village, where he got canoes across to an island in the centre, called Matipa. Here the shores on either hand were not visible, and the Doctor was put to great straits by the natives declining to let him use their canoes to cross to the opposite shore. He therefore seized seven canoes by force, and when the natives made a show of resistance, he fired his pistol over their

* This has not been received.

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heads, after which they ceased to obstruct him. Crossing the lake diagonally, he arrived in a long valley, and the rains having now set in fully, the caravan had to wade rather than walk, constantly crossing blind streams, and, in fact, owing to the high rushes and grass, hardly being able to distinguish at times the land, or rather what was generally dry land, from the lake.

"Dr. Livingstone had been weak and ailing since leaving Unyanyembe, and when passing through the country of Ukabende, at the south-west of the lake, he told Majwara (the boy given him by Stanley, who is now in my service) that he felt unable to go on with his work, but should try and cross the hills to Katanga [Katanda?], and there rest, endeavouring to buy ivory, which in all this country is very cheap (3 yards of merikini buying a slave or a tusk), and returning to Ujiji through Manyueme to recruit and reorganise. But as he approached the northern part of Bisa (a very large country), arriving in the Province of Ulala, he first had to take to riding a donkey, and then suffer himself to be carried on a kitando (native bedstead), which at first went much against the grain. During this time he never allowed the boy Majwara to leave him, and he then told that faithful and honest fellow that he should never cross the high hills to Katanda. He called for Susi, and asked how far it was to the Luapula, and on his answering 'three days,' remarked, 'he should never see *his* river again.'

"On arriving at Ilala, the capital of the district, where Kitambo the Sultan lived, the party were refused permission to stay, and they carried Livingstone three hours' march back towards Kabende. Here they erected for him a rude hut and fence, and he would not allow any to approach him for the remaining days of his life except Majwara and Susi, except that every morning they were all desired to come to the door and say 'good morning.' During these few days he was in great pain, and could keep nothing, even for a moment, on his stomach, He lost his sight so far as hardly to be able to distinguish when a light was kindled, and gradually sank during the night of the 4th May, 1873.

"Only Majwara was present when he died, and he is unable to say when he ceased to breathe.

"Susi, hearing that he was dead, told Jacob Wainwright to make a note in the Doctor's diary of the things found by him. Wainwright was not quite certain as to the day of the month, and as Susi told him the Doctor had last written the day before, and he found this entry to be dated 27th April, he wrote 28th April, but on comparing his own diary on arrival at Unyanyembe he found it to be 4th May; and this is confirmed by Majawara, who says Livingstone was unable to write for the last four or five days of his life. I fancy the spot where Livingstone died is about 11° 25' S. and 17° E.; but, of course, the whole of this is subject to correction, and, although, I have spent many hours in finding it all out, the Doctor's diary may show it to be very imperfect.

"I fear you will find this a very unconnected narration, but my apology must be that the Consul-General is not well, and the other assistant absent on duty, and there is much work for me to do. Mr. Arthur Laing has been entrusted with the charge of the remains and diaries, which latter he has been instructed to hand to Lord Derby.

"Trusting you are in the enjoyment of good health, and with great respect,—Believe me, dear Sir Bartle, your most obedient servant,

"FREDERICK HOLMWOOD."

The CHAIRMAN then introduced Mr. LAING to the meeting. That gentleman stated that up to half-past five o'clock there had been received no news of the arrival of the remains. The Peninsula and Oriental authorities seemed to think it very doubtful whether the vessel with the remains would get in before the next morning. On his journey from Zanzibar to Suez he had the opportunity of conversing with Mr. Wainwright, but there was but little to add to the account they had already heard. Wainwright had told him, however, that the Docter paid great attention to his boys, and was much beloved by all of them, and when any of them were sick he would wait two or three days for them on his journey. The Doctor, however, would not wait, and when he was seen to be failing the boys put him in a kantanju and carried him along. He (Mr. Laing) had hoped that Wainwright would have been there that evening to have given full particulars, as he read, wrote, and spoke English very well, and from the time of Doctor Livingstone's death until he arrived at Zanzibar he kept a full diary.

Mr. ASHTON W. DILKE then read his paper

ON THE VALLEY OF THE ILI, AND THE WATER-SYSTEM OF RUSSIAN TURKISTAN.

The shape of the valley of the Ili, like that of the present Khanate of Kokand, which it resembles very closely, is eminently calculated to make it play a very important part in the development of Russian Turkistan. At present the political situation of the country prevents the Russians from paying such attention to it as they probably will when some arrangement has been made with the Chinese; for, as yet, the Russians only consider themselves as holding Kuldja with the view of restoring it to the Chinese, if the latter ever regain their footing in Kashgar or the neighbouring parts of Mongolia, which is very doubtful. The natural frontier seems to be the watershed of the Ili, which is one of the seven rivers which give their name to the country, and which is cut off from the remainder of China by extremely abrupt mountains, and opens out only in the one spot where the Ili finds its outlet to the Balkash. I was unable to find any accurate maps or measurements of the district of Kuldja, but I saw enough to be convinced that all our present maps are exceedingly inaccurate, especially in the point of representing the breadth of the valley too great in comparison with its length. The valley rises in a gentle slope from the Ili, which flows nearly in the centre of it to the mountains on either side, which are not more than 50 miles apart, while from the commencement of the valley at Altyn-Emel to old Kuldja, the chief Russian port, is a distance of about 170 miles, according to the distances in the postal register; and from the latter town the mountains to the east can only be seen in bright weather at sunrise or sunset, which, calculating as usual in this dry air, gives a distance of about 120 miles, making the total length of the valley nearly 300 miles, or about six times its breadth. The mountains to the north of this plain rise to a height of some 12,000 feet, and are tipped with snow in July. There are two main roads across them: one from old Kuldja direct to Jin-Ho, about 160 miles, but with a waterless passage of nearly 70 versts in the centre; the other is the old Chinese post-road, from the ruined capital of New Kuldja, through Souidoun, one of the other Russian ports, to the valley of Talki, up which it runs a distance of 20 miles to lake Sairam-Nor, which lies at a height of over 7500 feet. The road was evidently kept in excellent repair by the Chinese, as the remains of bridges and post-stations, which are frequently met with, prove. It is now only used by the Kirghiz, who live in summer in the mountains, and by an occasional caravan going to Manas or Urumtsi. Sairam-Nor lies in extensive pastures, which are watered by the melting of the snows in the mountains on the western side, though as the lake never rises or falls, in spite of the considerable mass of waters which it receives, the Kirghiz have invented the usual theory of a subterranean outlet, which nothing seems to justify. Standing on the southern side of the lake, where the Talki Pass comes on to it about 500 feet above its level, we see the openings of three valleys: the first, beginning from the right, is that of the Kizim Chik, a narrow and

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very lovely ravine, running down to Mongolia on the northern side of the mountains which separate Kuldja from Jin-Ho, nearly up to this latter place; then, still on the right or eastern side of the lake, is a valley along which the Chinese road finds its way—a broad waterless valley, only marked on the latest Russian map as a "Dry Valley." It runs parallel to that of the Kizim Tchik, and leaves the mountains not far from the spot where the latter also does, close to the little town of Takianzi, and within sight of Jin-Ho. Exactly opposite the entrance of the Talki Valley on to Sairam-Nor is a break in the mountains, about 20 miles distant across the lake and close to its shore, which allowed me to catch a beautiful glimpse of the long chain of the Northern or Chungurski Alataon, close to Lipsa, across the deep valley of the Baratola, which gives the idea of some unfathomable gap between the nearer dark mountain range and the bright peaks beyond it. The mountains are almost everywhere 3 or 4 miles, and in some places recede 10 miles from the lake, which is about 60 in circumference, and the effect of its blue depths, set in green meadows, with the black forest-clad mountains all round running up to snowy heights beyond, is extremely lovely.

The valley of the Kizim Chik, which I descended, is either very narrow or very broad, as it may be taken—*i.e.* the distance between the snowy peaks on either side is considerable, as we saw whenever we got a glimpse out of our prison below; but the little stream itself is blocked in a ravine full of the most luxuriant vegetation, from which cliffs, in many places 1500 feet in height, rise perpendicularly, and effectually bar the view. The valley at length grows broader and the cliffs become bare masses of brown sand, quite abrupt and of some elevation, but bare of vegetation, and terrible reflectors of the scorching sun. Phalangas and tarantulas swarm. At length, after about 80 miles, the valley opens out into the plain. To the south, not far off, are the snowy mountains between the upper valley of the Ili, or rather that of the Kash, and Jin-Ho: the latter town appears under a promontory of the mountains as a mass of green reeds, and to the extreme left I thought that I could distinguish the lake Ebi-Nor, though the haze and mirage may have misled me. The Kizim Chik River, here about 15 yards in width and 4 feet deep, makes a sudden bend to the north, and either loses itself in sands, or, when full of water, reaches the Baratola in a marsh, when the latter is almost indistinguishable from the Ebi-Nor. The lake is extremly salt and bitter, very shallow, so that it is possible to ride out some distance in it, and surrounded by beds of salt and reeds, musquito and fever-haunts. Though it receives the Baratola and the Kar-Kara-Usa, two large rivers, the natives assert that it is drying up rapidly, as, in fact, all the salt lakes here are doing, the Balkash and Ala-Kul having been connected no long time back. The valley of the Baratola is formed by the union of three considerable rivers, which rise in the corner of the Alataon, near Kopat, and flow nearly 130 miles before falling into the Ebi-Nor.

Returning to the valley of Kuldja, I may briefly mention that it is intended to introduce two little steamers on to the Ili this year in all probability, though the distance from Semipalatinsk, on the water-system of Siberia, to the Balkash, is so great as to make it doubtful whether anything would be saved by them. The wealth of coal in the valley is immense, and the Chinese are known to have worked silver and gold with great profit; but it must be remembered that they had the advantage of slave labour, and that capitalists will be chary as yet of embarking in ventures on the Ili. I had no less than three offers made to me, in my quality as an Englishman, of untold riches and gold mines of fabulous extent, if I would only find the capital.

The Ili, which opposite Kuldja is about a quarter of a mile in breadth, and both swift and deep, is formed by the union of three main tributaries, the Kash, the Kunges, and the Tekes. The Kash joins it not far above Kuldja, near a high butte or isolated hill, which forms a landmark for the whole plain: it flows from east to west as does also the Kunges; but in spite of this, the Tekes, being the most considerable of the three, is generally considered as the Upper Ili. It rises not far from Issyk-kul, between that lake and the Musart Pass to Aksu, which lies under Khan-Tengri, the highest peak of the Thian-Shan, and flows nearly due east for about 100 miles, bending to the north round the last spurs of the Trans-Thian Alataon about 70 miles from Old Kuldja, at its junction with the two above-mentioned rivers. The valley of the Tekes is uninhabited, except by a few nomad Kirghiz and Kalmucks, and by panthers and wild boars, with occasional tigers, who find shelter in the enormous reed-beds which border the river. The valley is, on an average, about 40 miles in breadth, but decreases very rapidly near the Musart, where it enters the mountains.

In passing from the Tekes to Issyk-kul I crossed the watershed of the Charyn, which flows through a break in the Trans-Thian Alataon into the Ili, which is here only some 70 miles distant in a straight line, and further on an abrupt ridge of rocks divides this again from the basin of Iyssk-kul. The first view of this lake is very magnificent. The mountains rise from its very waters on every side: the Alataon to the north at a height of about 15,000 feet, and the Thian-Shan to the south about 18,000 feet, form two almost unbroken walls which reduce the immense breadth of the lake, nearly 40 miles, to nothing when seen from this elevation. The mountains at the other end of the lake, 110 miles away, show their peaks above the horizon of the waters so clearly outlined as to make them look within a few hours' ride.

Iyssk-kul, the "hot lake," lies at a height of over 5000 feet above the sea, about 60 miles from Vernoe at its nearest point, and about 250 from Kashgar. It is called Issyk-kul, or hot lake, from its never freezing, which fact is accounted for by the number of hot springs in it, making it impossible even to bathe in certain places, according to my informants. The water is very clear but slightly salt, though drinkable; it swarms with fish, which form the chief article of food for the Russian peasants who have colonized the valleys of the streams running into it. From Karakol, the chief Russian settlement at the east end of the lake, a little-known pass runs to Kashgar across the mountains; but the pass through the fort of Naryn, which is passable by the native carts, is universally preferred to it. Before the Russians occupied the Musart, the trade between Kuldja and Kashgar, to avoid Russian interference, went over that pass, which is so difficult that the horses have to be let down tied with ropes over one place; but now that the Russians have seized all the passes, the natives prefer the easier one through Fort Naryn. So unbroken is the chain of this huge range that the passes from Tashkend to Manas may be counted on one's fingers; only two, that from Aulie-Ata to Kokan, and from Vernoe to Kashgar through Fort Naryn, being fit even for the 9-foot wheeled arba, or carts, of the Sart traders.

In connection with Issyk-kul a very ingenious, and probably correct theory, has been made by Colonel Tchaikorski, of Samarcand. At present the Tchu—a swift and deep river which flows in a bed much larger than its present size would seem to allow it—passes close to Lake Issyk-kul, divided from it only by a narrow ridge. Iyssk-kul, as we know from the Chinese records, was formed by some convulsion of nature about 150 years back. The valley appears to have been thickly populated, judging from the remains of villages which are clearly to be seen under the water in several places, and from the fact that money and bones are not unfrequently washed up to the shore. Even a Spanish gold piece was once found in it. The depth of the lake is immense, judging from the inclination of the shores and the few soundings which have been taken, and the body

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of water in it must be enormous. The Chu, after leaving the ravine of Buam near Issyk-kul, flows through miles of steppe and sand, and loses itself in the lake Saimal-kul, which is only a few miles from the Jemman-Daria, part of the Syr-Daria. The formation of this marsh—for it is now little more—indicates that the Chu once must have flowed on into the Syr-Daria. Now, from the opposite side of this dried up lake on the Syr starts the old course of the Syr, called the Yani-Daria, which on most maps is only marked as reaching about half way to the Amu-Daria, but which was traced by the late expedition for the whole distance between the two rivers. This, again, falls into the Amu, almost exactly opposite the spot where the old course of that latter quits it for the Caspian. It will be seen that if the course of the Tchu be prolonged, following the curve of its course from Issyk-kul to Sáimal-kul, it would follow exactly the course which I have pointed out. May we not, therefore, conclude that not long ago the waters of Issyk-kul overflowed into the Tchu, and that that river, swollen to many times its present size, formed, together with the Syr and Amu, a stream sufficiently large to reach the Caspian. This theory disposes of the idea that the Amu by itself has not enough water to reach the Caspian, which has been urged against the scheme of turning the river into its former bed. The more I have thought over this idea, the more the simplicity and probability of it has forced itself into my mind, and an examination of the land between Sáimal-kul and the Jemman-Daria showed distinct traces of water upon it at a period not far back. All this strip of land is lower than the adjacent country, covered with marshes, half-dried pools, which any river turns into lakes and reed-beds, which bear witness to the fact that a great river once flowed here. To drain Issyk-kul would be a task beyond almost any government, not to speak of one so feeble as Russia in Turkistan, and to regulate the outpour of its waters into the Chu would be almost impossible.

I did not myself pass through the ravine of the Chu, near lake Issyk-kul, but all the persons with whom I spoke agreed in saying that it has no connection with the lake. I knew that in many maps a little junction was marked, but knowing also how frequently it happens that, when a river passes close to any lake, some adventurous geographer inserts a connection which does not in reality exist, I considered that it must have been so in this case also. I now, however, find in Colonel Wirgman's translation of Von Hellwald's work the following passage:—"It (Issyk-kul) was long considered as the original source of the Chu; but only a small affluent of the Chu, the Kutemaldy, flows into this mountain-lake." I do not know whether the mistake is that of the author or of the translator; but, even allowing that "out of" should be read for "into," he would contradict himself by saying, as he does, that "a small plain, gently sloping towards the east, lies between the lake and the Chu," in which case this supposed affluent would flow up-hill. If the words are correct, the Chu would divide into two branches, one falling into Issyk-kul, and the other passing on to the plain below, which, I believe, never happens—never, at all events, with a stream so swift as the one in question.

I need hardly point out the importance of this to the Central Asian question. The turning of the Amu-Daria has often been mooted, and the chief reason against it has been the want of water to allow its navigation from the Caspian; whereas, if this volume of water could again be poured into it, we may consider that it would, at all events, be sufficient for floating rafts, or the little steamers, which on the Syr-Daria now cross places less than 4 feet deep. The superiority of such a route over the present roads, or even over the projected railway, would be considerable, as the native merchants care very little for speed of traffic, and a great deal for its cheapness.

Another fact that I would wish to call attention to is that Russia has it in her power at any moment, without sending a single man beyond her frontiers, to make all Bokhara perish miserably. At the present time the authorities of Bokhara send occasional statements to the governors of Samarcand as to the quantity of water which is required in Bokhara, acting on which the governor orders the arks or irrigation-canals, in the district of Samarcand to be opened or shut for so many days. By turning the Zarafshan into these canals, a step which could be taken in two days, not a drop of water would reach Bokhara.

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AMERICAN GEOGRAPHICAL SOCIETY.

February 16th, 1874.

CHIEF JUSTICE DALY after some preliminary remarks, introduced Gen. JAMES H. SIMPSON, U. S. Army, who read a paper on—

THE EXPLORATIONS OF FRANCISCO VASQUEZ DE CORONADO IN SEARCH OF THE SEVEN CITIES OF CIBOLA.

He said,—It is probably a very common belief among the masses that this continent was first inhabited by a civilized people, after Christopher Columbus discovered it in 1492; but the ruins which at the present day remain, many of which I have myself seen, together with their history, which has come down to us from Spanish explorers, as early as the middle of the 16th century, attest with unerring certainty that this continent had been previously inhabited by a people who were so advanced in civilization, that they lived in organized communities, cultivated the soil, and inhabited cities or villages, the houses of which were made of stone, planned in the most methodical manner, and built with a precision, and in such magnitude, as to challenge, even now, the admiration of the modern explorer, and to eclipse in style and durability those of the present day, which have been the achievements of the Spaniards and Mexicans of more recent times. With regard to the mounds and other evidences of a people long passed away and which had been found throughout our land, on the east side of the Rocky Mountains, I am not aware that they are of such a character as to show that the originators of them were anything else than barbarians, or at least a race that had made but little progress in the arts of civilized life. Such an inference, however, just in reference to the *tumuli* aborigines of this country, would be very unfair in reference to the builders and denizens of the immense stone and regularly constructed edifices, which are at the present time to be found in ruins, in New and Old Mexico, and in Central America. In the fall of 1849 I was military engineer to a body of troops which was commanded by the late Colonel John M. Washington, U. S. Army, then Governor of New Mexico, and which made an expedition into the country occupied by the Navajos, lying some 200 miles to the south-west from Santa Fé. In the course of our march, after crossing the *Sierra de los Mimbres*, or as it is laid down on some maps, the *Sierra Madre* (the high convex land dividing the tributaries of the Gulf of Mexico from those of the Pacific), we came to the Rio Chaco, a small tributary of the Rio San Juan, which is itself a tributary of the Colorado of the West. Learning from our guide, a Spaniard, that on this tributary there were some ruins of edifices of an origin unknown to the Indians, among whom they were situate, I obtained leave from my commanding officer, and with the guide, and seven Mexicans as an escort, with Mr. Richard M. Kern, who had been with Fremont, as my artist, I absented myself two days from the command in search and examination of these ruins.

We first came to a ruin called by the Pueblo Indians of the present day the Pueblo of Montezuma; by the Mexicans, the Pueblo Colorado; by Hosta, an Indian, the Alcalde of Zemas, the Pueblo de Patones; by Sandoval, a friendly Navajo Chief, Pueblo Grande; and by our guide, Pueblo Pintado. Here was a structure still standing, with its walls, in places in their integrity,

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as many as four stories high, which had been built of tabular pieces of a hard, fine-grained, compact, grey sandstone (a material entirely unknown in the present architecture of New Mexico), to which the atmosphere had imparted a reddish tinge, and on which account it was doubtless called Pueblo Colorado, and also Pueblo Pintado. The several courses of stone on the exterior faces of the walls were not more than 3 inches thick, the intervals between being chinked with laminar stones of the minutest thinness; the whole presenting at a little distance the appearance of a magnificent piece of mosaic work. The filling and backing were done in rubble masonry, the mortar showing no indications of the presence of lime, but appearing to be the ordinary earth of the country. The thickness of the main wall at base was about 3 feet; at the second story it was less, diminishing every story by retreating jogs from the inside. Its elevation at its then highest point was between 25 and 30 feet; the series of floors indicating these must have been originally at least four stories. I found no signs of the genuine arch about the building; the lintels of the doors and windows were pieces of wood, sometimes laid horizontally side by side; others a single stone slab laid in this manner, and occasionally a series of smaller stones, so placed horizontally upon each other that, while presenting the form of an acute angle in elevation, they would support the weight of the fabric above. The ground plan of the building, including the court, in exterior development was about 400 feet. On the ground floor, exclusive of the out-buildings, were fifty-four apartments, some of them as small as 5 feet square; and the largest about 12 by 6 feet. The rooms communicated with each other by very small openings, some of them as contracted as 2½ feet square. The principal rooms, or those most in use, were, most probably, those of the upper stories, the larger windows indicating this; though nothing could be definitely determined on account of the partitions between the rooms no longer existing. The system of flooring seems to have been unhewn beams, 6 inches in diameter, laid transversely from wall to wall, and then a number of smaller ones about 3 inches in diameter, laid across them. What was placed on these did not appear, but most probably it was bush, bark, or slabs, covered with a layer of earth mortar. The beams showed no signs of the saw, but seemed to have been hacked off with some imperfect instrument. At different points about the premises were three circular apartments, sunken in the ground, the walls being of masonry. These apartments the Pueblo Indians called *Estufas*, or places where the people had their political and religious meetings. The site of the ruins was a knoll, some 20 or 30 feet above the surrounding plain. Fragments of pottery in large quantities lay strewn around, the colours still very bright, and showing taste in their selection and in the style of their arrangement. The bed of the river Chaco, now an arrayo or dried up river, passed by it 200 or 300 yards distant, and no wood or grass was visible in the vicinity.

Hosta, the Pueblo Indian from Hernez, of which he was the Alcalde, who accompanied the troops, said this Pueblo had been built by Montezuma and his people when they were on their way from the north to the south; that after living here awhile they dispersed, some going east and settling on the Rio Grande, and others south into Old Mexico. About 12 miles further down the valley, or cañon of the Chaco, we came to another ruined structure called by our guide Pueblo Wege-gi. The walls of this building like the Pueblo I have before described were composed of very thin tabular pieces of compact sandstone. The circuit of the structure including the interior court was about 700 feet. The number of apartments on the ground floor, judging from what was distinguishable, must have been about 100. The highest existing elevation of the exterior walls was about 25 feet, the great mass of fallen *débris* at the base showing it must have been originally higher.

General SIMPSON then gave a description of other ruins farther down the cañon, of great extent and importance, and which contained rooms in a state of perfect preservation. After having detailed minutely the features of nine ruined edifices, all situated within an area 18 miles square, he said that it was a remarkable fact that these substantial ruins were now in a desert destitute of verdure and water, thus indicating a great change of climate. Of the origin of these ruins the Indians dwelling about them knew nothing. They must have been built, however, in remote ages by a people superior to the present race of Indians. Humboldt located the first resting-place of the Aztecs in their migration from North to South, near those ruins in the cañon of Chaco, which he had described. The learned gentleman then gave a lengthy account of the explorations of the Spaniards who, in the years 1540 and 1542, went in search of the seven lost cities of Cibola. After describing the perils of the expedition, before arriving at its destination, he said:—

On the following day, in good order, they entered the inhabited country; Cibola was the first village they discovered; on beholding it, the army broke forth with maledictions on Friar Marcos de Nica. "God grant that he may feel none of them." To continue Castañeda's relation, "Cibola is built on a rock; this village is so small that in truth, there are many farms in New Spain that make a better appearance. It may contain 200 warriors. The houses are built in three or four stories; they are small, not spacious, and have no courts, as a single court serves for a whole quarter. The inhabitants of the province were united there. It is composed of seven towns, some of which are larger and better fortified than Cibola. These Indians, ranged in good order, awaited us at some distance from the village. They were very loth to accept peace; when they were required to do so by our interpreters, they menaced us by their gestures. Shouting our war-cry of 'Sant Jago,' we charged upon and quickly caused them to fly.

"Nevertheless, it was necessary to get possession of Cibola, which was no easy achievement, for the road leading to it was both narrow and winding. The general was knocked down by the blow of a stone, as he mounted in the assault, and he would have been slain, had it not been for Garci Lopez de Cardenas and Hernande d'Alvarado, who threw themselves before him and received the blows of the stones, which were designed for him, and fell in large numbers; nevertheless, as it is impossible to resist the first impetuous charge of Spaniards, the village was gained in less than an hour. It was found filled with provisions, which were much needed, and in a short time the whole province was forced to accept peace."

The main army which had been left at Culiacan under the command of Don Tristran d'Avellano, followed Coronado, as directed by him, every one marching on foot, lance in hand and carrying supplies. All the horses were laden. Slowly and with much fatigue, after establishing and colonizing Sonora, and endeavouring to find the vessels under Alarcon, already referred to, by descending the river, in which they failed, the army reached Cibola. Here they found quarters prepared for them, and rejoiced in the reunion of the troops, with the exception of certain captains and soldiers who had been detached on explorations.

After giving an exhaustive account of the return of Coronado, the General concluded with these words:—"Thus ended this great expedition, which, for extent in distance travelled, duration in time, extending from the spring of 1540 to the summer of 1542, or more than two years, and the multiplicity of its co-operating branch explorations, equalled, if it did not exceed, any land expedition that has been undertaken in modern times."

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BERLIN GEOGRAPHICAL SOCIETY.

HERR STUMM ON THE UST-URT PLATEAU AND THE OXUS STREAM.

HERR STUMM has communicated to the Berlin Society some remarks on the countries visited by him during the late Khivan Expedition. Among other regions his attention was directed to the little known Ust-Urt plateau between the Aral and Caspian Seas. Humboldt's opinion with regard to this elevated tract was, that it formed a continuation of the Ural system; but a careful examination of the minerals and fossils brought home by Stumm, has persuaded Dr. Bauer, an eminent geologist, that the Ust-Urt must, at a comparatively recent period, formed part of the great Caspi-Aral Sea basin, and that the *fauna* was identical with that found in those seas at the present day, and in many instances with that peculiar to the Euxine. The Ust-Urt plateau, moreover, is not a uniform and continuous table-land, but is composed of various elevations and depressions. It is destitute of vegetation except when there is any moisture in the atmosphere; but animal life, on the other hand, is by no means deficient. Flamingoes, cranes, wild geese and ducks are found 100 versts inland, while to the west a certain breed of small wild horses, wild asses, foxes, and hares, are plentiful. Stumm observed some finches, swallows and crows, and in the rocks of the Chink or edge of the Ust-Urt, eagles and vultures, while chameleon-like lizards, snakes, scorpions, and other reptiles were not uncommon. There were no traces of any human habitations visible, occasional wells and graves being the only tokens of man's handiwork. The temperature underwent astonishing changes: in the daytime it was as high as from 38° to 40° R., while at night it fell to 4° or 6°.

Lieutenant Stumm's researches on the subject of the Oxus and its old course agree in the main with those of Herr Roesler, an authority of weight. He ascertained that the Turkmen have a tradition that the Tejend and Murghab, which now lose themselves in the sands, formerly flowed into the western stream of the Oxus. From a comparison of all available authorities on the subject of the respective levels of the Caspian and Aral, Stumm points out that, during the period 1826 to 1858, the level of the Sea of Aral gradually approached that of the Caspian to the extent of 12 feet, and that at present the mouth of the Oxus is 106.3 English feet above the level of the Caspian. In conclusion, he enunciates a very decided opinion against the possibility of turning the waters into their old channel, and regards an eventual fertilization by that means of the Kizil-Kum Desert, as purely chimerical.

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FRENCH GEOGRAPHICAL SOCIETY.

Meeting of March 20th.

THE President, M. DELESSE, informed the meeting of the results of the transactions of the administrative commission of the forthcoming Congress. The programmes are in preparation, and the Admiral de la Roncière, as well as Baron Reille, are taking the necessary steps for the organization of the Congress.

M. DAUBREE in giving the latest news from Nordenskiöld, announced that Lieutenant Parent, of the Italian Navy, who had been the indefatigable assistant of Nordenskiöld, was present, and would give a narrative of the proceedings of the expedition.

Lieutenant PARENT stated that on account of the ice the expedition had not been so successful as was anticipated. They left Tromsö for Bear Island, but the inclemency of the weather prevented their reaching it. The vessel being an ironclad the compass became useless. In Spitzbergen they touched the South Cape, yet unknown, but the dense fog prevented their making any astronomical observations. From that point they made Isfjord, where a colony of Swedes had settled in order to work sulphate beds, but without success. In the month of August the expedition was stopped in Mussel Bay on account of the necessity of wintering there. The voyagers had provided themselves with a wooden house wherein to pass the winter, in those high latitudes; and were successful in making magnetic, meteorological, and astronomical observations during their hibernation.

The ships were suddenly frozen up in Mussel Bay, and from the 14th of October to the 12th of March the sun had not once appeared. During that time observations were made every hour, and on the 1st and 15th of every month magnetic observations were made at intervals of five minutes. With the 9th of November complete night set in—not so bad as that of our own climes on account of the moon and the northern lights. No mammalia, except bears and sea-calves, were seen, nor were any birds. Once only did the voyagers fancy they heard the note of a bird. Of their observations the most interesting were meteorological, which were made under 80°. More than once during the winter the snow melted, and the temperature rose to 0°. The south-easterly winds, which ceased to blow in February, gave the temperature of 0°; the north-easterly gave —27° (centigrade). The intensest cold observed was —38°, 5', not so much as might have been expected.

In consequence of the sudden formation of the ice, the stock of provisions had to be divided amongst 66 men. The expedition had brought 40 reindeer to Spitzbergen, 39 of which were lost. This misfortune compelled the explorers to draw their own sledges when they started northwards to reach Parry Island, where they were stopped by ice barriers. It was a hard day-and-a-half's work to cross one of these barriers. The expedition having only brought 60 days' provisions with them, it was impossible to proceed at such a slow rate, consequently they gave up the attempt, and set out in the direction of North-East Land. After a march of fifteen days they came to Loken Strait, where they learnt that the ships had sailed on the 1st of July.

Dr. HAMY, an officer of the Natural History Museum, added that M. Parent was about to proceed to the Soudân in order to compare the races in the south with those of the north. When looking at the specimens preserved in the Museum, Parent remarked to him that men of the Akha dwarfish race had been sent by Miami as a present to the King of Italy. Dr. Hamy said that that type was not so exceptional and unheard of as some imagined. The negro drummer of the time of the first empire, preserved in the Museum, who claimed to be a Bornu, had the same anatomical characteristics as this race. According to information collected by Admiral Fleuriot de Langle, the Bungu tribe, living at the mouth of the Fernan Vazy River, was another branch of the same race.

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THE

GEOGRAPHICAL MAGAZINE.

JUNE, 1874.

THE RAILWAYS OF PERU.

THE construction of the Peruvian railways is, when all the circumstances are taken into consideration, one of the most remarkable engineering enterprises of our time. The land of the Yncas is divided into three distinct regions, the rainless coast deserts, with rich and fertile valleys at intervals where the rivers reach the sea; the *sierra*, including the mountain ranges of the Andes with their deep valleys, lofty plains, and towering peaks and ridges; and the *montaña*, or vast Amazonian forest-covered plains to the eastward. Each of these regions is bounteously gifted by nature. The first yields crops of sugar and cotton, abounds in vineyards and oliveyards, and is supplied by its huanu and nitrate of soda with a marvellous source of wealth. The second is the famed land of silver and copper, while its mountain slopes give pasture to sheep, alpacas, and vicuñas, and its valleys yield harvests of corn of all kinds, and edible roots. It is the home of the potato, and of the largest kind of maize. The third, while still uncleared, is the native place of the chinchona bark, of sarsaparilla, and ipecacuanha; the few clearings produce coca, and the finest coffee and cocoa in the world; while it offers millions of acres of virgin soil for future enterprise.

But these three regions of Peru are separated from each other by stupendous barriers. The maritime cordillera towers up from the coast deserts to peaks over 20,000 feet high, and the rise is so abrupt that no such view of mountain scenery can be obtained in any other part of the world. The highest mountains of the Alps could be fitted into a ravine of the Andes, while the loftier peaks of the Himalayas are dwarfed from the point of view of a spectator, because they are seen from a much higher position. Thus the region of the Peruvian coast is isolated from that of the *sierra* by a mountain barrier only to be passed through dizzy and lofty passes, and over frozen ridges. A similar barrier between the *sierra* and the *montaña* is presented by the Eastern Andes, whose peaks are the loftiest in the New World. The passes leading from the snowy summits to the tropical forests have often been described, but never more truthfully than by the old historian Garcilasso, 300 years ago. Speaking of the approach to the *coca* estates of the Paucar-Tambo Montaña, he says—"A mountain is crossed, called Canachuay, by an almost perpendicular descent, 5 leagues long, and it causes terror even to look at it; how much more to ascend and descend it, for along the whole length the road goes down in the shape of a serpent, turning first to one side and then to the other."

The ancient lords of this marvellous country, the Yncas of Ttahuantin-suyu (or the four quarters, the provinces to the north, south, east, and west of their capital of Cuzco), grappled with and overcame the dividing barriers. They saw that no victories could be complete, no system of administration permanent and efficient, unless communications were rendered easy. The road system of the Yncas was suited to the requirements of a people without horses, and whose only beasts of burden were llamas. Peru is the only country where footways have been brought to perfection; and in no country in the world are the engineering difficulties greater. Paved roads were not only carried along the whole length of the coast deserts, and of the *sierra* region between the two cordilleras, but they also connected the coast with the *sierra*, and the *sierra* with the *montaña*. Causeways were made over vast swamps, revetments were built up the sides of perpendicular ravines, and rivers were spanned by admirable rope bridges; while magazines of provisions and rest-houses were erected at regular intervals. It was through this means that the original civilization of Peru was established and rendered permanent; and so admirably perfect was the system that, as that observant statesman Ondegardo tells us, it worked almost of itself, long after the Yncas had been dethroned, and the unhappy land had been overrun by the Spaniards.

It would be unjust to deny that Spanish domination was marked by able statesmanship, and that the legislation of the Council of the Indies, except in matters connected with religion, was remarkable for beneficence and liberality in all that concerned the natives. The Spanish viceroys were generally earnest and zealous statesmen, and they were often assisted by administrators, such as Ondegardo and Solorzano, of marked ability and breadth of view. But the aims and policy of Spain were not those either of the Yncas or of modern civilization. Spain sought the spiritual welfare of the Indies, but the material well-being only of the mother country. Hence the system of communications formed by the Yncas came to ruin, and the Spaniards supplied a very poor substitute. Mule tracks were necessary to bring the silver to the places of shipment, but there were no made roads, and, except in half-a-dozen places, no bridges but those of the Yncas.

Peru of these days, now that she has at last established an enlightened government, has again to build up a system of communications from the very beginning.

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The work of the Yncas, when its objects and the means available are considered, was perfectly adapted to the ends in view, and is a marvellous monument of efficiently organised labour, guided by skill and judgment, and pushed forward with energy and perseverance. But the Peruvian Republic, under the administrations of Balta and Pardo, and aided by that prince of contractors, Henry Meiggs, has very nobly emulated the example of the Yncas. Roads, as ready means of communication, are as essential to the civilization of modern as they were to that of ancient Peru. Moreover, these means of communication must be the forerunners, not the consequences, of advancement. They must awake dormant energies, tap the riches of secluded valleys and inaccessible wildernesses, and cause new wants and desires. They cannot be expected for years to give any money return on the outlay; not, indeed, until the whole system is complete, and has had full time to produce the desired results. In deciding upon a system of railways, there were two courses. The valleys on the coast might with ease have been connected with each other and with the sea; and a line might have been constructed longitudinally in the *sierra*, between the great ranges of the cordilleras, without encountering any insuperable difficulties. But this would only cause partial good. The other course presented much more formidable difficulties. It was to do what the Yncas did, to connect the coast with the *sierra*, and the *sierra* with the *montaña*, by overcoming the mighty barriers of the Andes. It was thus alone that the civilization and enterprise of modern times could restore to Peru that prosperity which she enjoyed in the days of the Yncas; and it was this course that the Peruvians determined to take. It was the resolve of a patriot nation, which will surely meet its reward. There will be a system of transverse railways bringing the valleys of the Andes into direct communication with the sea, and also a longitudinal line, from Puno to Cerro Pasco, and onwards to Caxamarca and Jaen, linking the transverse lines together. The projected railroads of the Peruvian Government, some completed, others under construction, have a combined length of 1281 miles, and will cost 128,354,600 *soles* (1 *sole* = 5 francs); and the private lines have a length of 496 miles, and will cost 24,420,000 *soles*. There are also two lines, partly private, and partly belonging to the State, with a length of 253 miles, and costing 27,200,000 *soles*. Altogether 22 lines, with a length of 2030 miles, and a total cost of 179,974,600 *soles*, or about 37,500,000*l*. Truly this is a gigantic undertaking for a nation numbering barely three millions of people; yet half the money has actually been paid, and 620 miles of rail have already been laid.

Great praise is due to Mr. Meiggs, the American contractor, who has undertaken to build seven railways for 133,000,000 *soles;* has actually completed two, while the remaining five, the longest and the most difficult, are in process of construction. But his greatest praise is due because his work is never "scamped," and is always the best of its kind. Professor Orton, of New York, who has recently returned from a visit to Peru, tells us that better laid rails, more finished bridges, culverts, and masonry work, and more admirable achievements of engineering skill are not to be found in any other part of the world. In the minutest details the work is of the best description. The gauge of all the lines is 4 feet 8½ inches, except that of Chimbote, which is 3 feet. The rolling stock is American, a locomotive delivered on the line costing from 20,000 to 25,000 *soles*, and a first-class carriage 5500 *soles*. The ties are from Oregon, the rails from England, as well as the stationary machinery, which is from Leeds. The shops and stations are generally of English galvanized iron. The engines are invariably English or American, and the labourers are Peruvian Indians (descendants of the men who made the roads of the Yncas), Chilians, and Chinese.

Commencing from the north (1) the first line connects the sea-port of Payta with the valley of Piura, where stands San Miguel, the first city founded by Pizarro. It is 63 miles long, and was contracted for in July 1872, giving facilities to several valuable cotton estates in the vale of Chira. The intention is to extend the line across the Andes, as far as Limon on the great river Marañon, passing through the provinces of Jaen and Huaca-pampa. (2) The next railway goes from the port of Pimentel to Chiclayo with a branch to Lambayeque, and is a private undertaking. The line is 45 miles long. (3) Another private line connects the sea-port of Eten and Ferreñafe, and is 50 miles long. The line passes by Monsefu, Chiclayo, and Lambayeque, and a branch connects several rich *haciendas* (farms): 48 miles are already opened. (4) The railroad from the port of Pacasmayo to Magdalena, a distance of 93 miles, is a State enterprise, and is eventually to be extended to Caxamarca: 73 miles are already completed and open for traffic. Starting from an iron mole, half a mile long, at Pacasmayo, the line passes up the valley of the river Jequetepeque, and through the village of San Pedro, the capital of a rich agricultural region, containing vast areas covered with sugar-cane, and corn; and thence over a desert to its present terminus. (5) The next line, proceeding south, is from the port of Malabrigo to Ascope, 25 miles long, and is intended to tap the rich sugar and rice estates of the vale of

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Chicama. (6) The railway from the port of Salaverry to Truxillo is a State undertaking, connecting the capital of an important department with the sea at Salaverry, a distance of 85 miles. (7) The State railway from Chimbote to Huaraz is 172 miles in length, and is to extend to the mining district of Recuay. It passes up the valley of Santa, and then southward along the highlands, and is designed to open up the rich mines of the Department of Ancachs (see *Geographical Magazine* for May, p. 78): 40 miles are completed. (8) A railroad, 15 miles long, on the heights of Cerro Pasco, has been constructed by a private company, to connect the famous silver mines with the town. It was commenced in 1869, but only 8 miles are yet completed. (9) Lima is connected with the port of Chancay to the north by a line 43 miles long, (10) with its sea-port of Callao, (11) and with the bathing-place of Chorillos. The two latter lines have been at work for the last twenty years. That from Lima to Callao was opened in 1851.

(12) The grandest Peruvian undertaking is the railroad from Lima, across the maritime cordillera of the Andes to Oroya in the *sierra* valley of Xauxa. It is 136 miles long, of which 60 are finished. The work was commenced in 1870, and Mr. Meiggs has undertaken to complete it in 1876. It is thus described by Professor Orton:—"Starting from the sea, it ascends the narrow valley of the once sacred Rimac, rising the first 46 miles nearly 5000 feet. Then it threads the increasingly intricate gorges of the Andes, by a winding giddy pathway along the edge of the precipices and over bridges that seem suspended in the air. It then tunnels the Andes at an altitude of 15,645 feet, the most elevated spot in the world where a piston-rod is moved by steam, and terminates at Oroya, 12,178 feet above the sea. The difficulties encountered in its construction are without a parallel. The valley narrows to a ravine, and then to a gorge, till the closing mountains fairly overhang the infant Rimac. In fact, at one point a stone dropped will fall on the opposite side of the stream. So that in forcing the railway up the cordillera, the engineers have literally threaded the mountains by a series of sixty-three tunnels, whose aggregate length is 7000 yards. The great tunnel of Galera, by which the locomotive will finally cross the Andes, will be 1266 yards long. Besides boring the flinty rock, and constructing enormous bridges, embankments, and cuttings, the workmen [of whom 8000 have been engaged at one time] have had to contend against land-slips, falling boulders, and the disease prevalent at enormous heights, known in Peru as *soroche*. About 7000 have been killed or have died in the construction of the road thus far. Of the bridges, that of Verrugas is the most remarkable structure of the kind in the world. It spans a chasm 580 feet wide, and rests on three piers. The base of the middle pier is 50 feet square, and its height is 252 feet, of hollow wrought-iron columns made at Phœnixville, in Pennsylvania. The maximum gradient on the line is 4 per cent., the sharpest curve 395 feet radius." In course of time branches will diverge from Oroya to Tarma and Xauxa, which will be future fashionable places of resort for consumptive patients; to the silver mines of Cerro Pasco, and to Fort San Ramon in the *montaña*, at the head of Amazonian navigation on the Mayru. (See *Ocean Highways* for October 1873, p. 269.) Thus Lima and her Pacific trade will be in direct communication with the Atlantic, by rail and steamer across the widest part of the South American continent.

To the south of the Peruvian capital (13) a longitudinal line will connect Lima with the port of Pisco, traversing the rich coast valleys of Lurin, Mala, Cañete, and Chincha, a distance of 145 miles. A company has been formed for its construction by Don Manuel and Don José Ramos, and the Government contributes 2,600,000 *soles* out of the 9,200,000 that it will cost. It will open up some of the richest sugar estates on the coast. (14) The next line, to the south, is from the port of Pisco to the town of Yca, a distance of 48 miles. It is now completed, and opens up a splendid cotton and vine producing region. (15) The Arequipa railroad was commenced in 1868, and completed in 1870. Starting from the port of Mollendo, its length is 107 miles, nearly the whole of which is over a waterless desert. The old mule road to Arequipa commenced from the port of Islay, but it was found necessary to make the railway terminus at Mollendo, 34 miles further south. The line has since been continued across the Andes to Puno, on the shores of lake Titicaca; and its completion from Mollendo to Puno makes this railway the longest south of the equator. It is also the loftiest and the most serpentine line in operation anywhere, and no other road in the world can show so much heavy work. On the first division 7,000,000 cubic yards were removed. The deepest cutting is 90 feet, the highest embankment 112 feet, and 27,000 cwts. of powder have been used for blasting. On the second division the total amount of excavation was 9,858,000 cubic yards; the deepest cutting 127 feet, and the highest embankment 141 feet. There is only one short tunnel in the whole 325 miles, and only four bridges, the longest being 1690 feet. The road crosses the Andes, 116 miles east of Arequipa, at a height of 14,660 feet, where there is a cutting only 6 feet deep. The Oroya railroad excels in the engineering difficulties that have been overcome, but the Arequipa and Puno line is first in the amount of excavation, and probably in the sufferings of the labourers, from the difficulty in procuring food and fuel; the intense cold, and the rarefied air. Great altitudes, however, give one advantage, steam is generated more freely, and hence less fuel is required. In order to supply the port of Mollendo, which is surrounded by an arid desert, with water, a pipe has just been laid alongside the line for 85 miles. This is the longest iron aqueduct in the world. It starts from near Arequipa, at an elevation of 7,000 feet, and crosses the great desert between that city and the coast, discharging 433,000 gallons in 24 hours. The cost was 20,000 *soles* per mile. Puno, the inland terminus of the railway, is connected with Bolivia by steam navigation across lake Titicaca, and thus the coffee, cacao, and chinchona bark of the *montaña*, and the silver, copper, and alpaca wool of the *sierra* will find easy access to the coast. A branch line is to be made from Juliaca, a station near Puno, to the famed city of Cuzco, the ancient capital of the Yncas, a distance of 230 miles. The contract was accepted by Mr. Meiggs in December 1871, and the work has been commenced. It will be the first longitudinal line in the *sierra*, between the cordilleras of the maritime and the eastern Andes. The highest point is 14,150 feet

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above the sea, over the water-parting which divides the basin of lake Titicaca from the valley of the Vilcamayu. This point, called La Raya, is about 100 miles north of the Juliaca station. Thence the line descends to 11,000 feet, following the course of the Vilcamayu, and Cuzco is 11,375 feet above the sea. There are no tunnels, and the total amount of excavation will be 5,500,000 cubic yards. The mere freight on the material for this railroad would be sufficient to build it in the United States.

Going south, along the coast, (16) the next railroad is that from the port of Ylo to Moquegua, 63 miles long, which is finished. It opens up the richest wine-producing district in Peru. (17) Next comes the line of 39 miles from Arica to Tacna, which was commenced in 1852, and opened for traffic in 1857. A company has been formed by Messrs. Hainsworth and Co., of Tacna, and Emile Erlanger and Co., of Paris, to continue this line from Tacna to the frontier of Bolivia. The company has been formed in England, with a capital of 18,000,000 *soles* (3,600,000*l.*). The length of the line will be 108 miles, and it will form a fifth transverse railroad across the Andes, connecting the coast with the *sierra;* of which one is already open for traffic. The most northern is the projected line from Payta to the banks of the Marañon. Then comes the line from Pacasmayo to Caxamarca. The third is the famous line from Lima, the capital of Peru, to Oroya. The fourth, passing by Arequipa, connects the Pacific Ocean with lake Titicaca, which is 12,000 feet above it. The fifth will be this line from Arica, by Tacna, to the Bolivian frontier.

But the list of Peruvian railroads is not even yet exhausted. The most southern coast province of Peru is the desert one of Tarapaca, separated from Chili by the wastes of Atacama. Its vast wealth consists in deposits of nitrate of soda and in borax. (18) Railroads have been commenced from the ports of Iquique, Patillos, and Pisagua to the nitrate of soda works, 93 miles of which are completed, and 69 miles are well advanced. The whole system will include 180 miles of rail. The contractors, Don Ramon Montero and his brother, propose to extend the line to Pica, and thence to Bolivia, having entered into a contract with the government of that Republic. Eventually this will form a sixth transverse line across the Andes.

Time will be required before the results of this marvellous system of communications begin to show themselves. The wealth of Peru is vast and inexhaustible; but trade is comparatively small as yet. Alpaca wool, the great export from South Peru, only leaves the coast in quantities not exceeding 10,000 quintals. The railroads will create trade. Many an enterprise —with all the elements of success save one—has been abandoned owing to the difficulties of communication; these difficulties will now disappear. Such sheep farms in the heart of the Andes as that which Mr. Mardon had at Tincopalca, will no longer be hundreds of miles from a market. The produce of the coca, coffee, cacao, and chinchona plantations of the *montaña*; of the mines and pastures of the Andes; of the sugar, vine, and cotton estates of the coast, will all be joined together, and to the ports of export, by the railroads; just as the Yncas united their provinces by their admirable system of foot roads. Isolation will cease, and enterprise will increase its efforts and multiply its undertakings a hundredfold. Emigration, the great necessity for Peru, will be promoted by this activity; and these various causes will bring remunerative returns to the railroads in course of time, and after the whole system has been connected with the lines of the Argentine Republic, and with the steamers on the Amazon.

But the Peruvian Government need not wait so long for that return which their efforts have so fully earned. There will be indirect beneficial results, fully as precious and as important as future money returns, which will follow immediately on the opening up of the interior of Peru. These will be the enlargement of mind, the creation of new ideas and new desires, which are the inevitable consequences of improved means of communication. It will never be forgotten that these results were largely promoted by the enlightened and honest administration of Don Manuel Pardo.

CLEMENTS R. MARKHAM.

THE INDIAN TERRITORY AND ITS INHABITANTS.*

THE Indian territory, where the principal civilized Indian tribes are located, is bounded on the north by the State of Kansas, on the south by Texas, on the east by Missouri and Arkansas, and on the west by Texas and the territory of New Mexico. It contains about 70,000 square miles, or a larger area than the six New England States combined. In agricultural advantages and delightful climate, it is unsurpassed by any section of the country of equal extent; the south half of it is excellent for cotton, while corn and wheat, and the best of fruits, are produced in all its settled portions. It rivals Texas as a stock country, and is much superior to Kansas in this respect. Coal, iron, lead, zinc, copper, and salt and petroleum springs abound throughout the territory; the coal is bituminous and lignite, and is of a very superior quality; none but surface measures have as yet been developed; these, at the Kansas line, are found 18 inches in thickness; they increase as you travel south, until near the southern boundary of the territory, they are 6 feet thick.

The principal tribes occupying this country are the Cherokees in the north, the Creeks and Seminoles in the middle, and the Choctaws and Chickasaws in the south: they are known as the five civilized tribes; all of them, except the Seminoles, have a written constitution and code of laws. These Indians have traditions that about 400 years ago they occupied extensive territory in the north-western part of Mexico: they probably belonged to the Aztec empire. After the fall of Montezuma, they moved in a body across the continent to the shores of the Atlantic, being fifteen years on the journey, and fighting and conquering all the hostile tribes that opposed them; they adopted the vanquished, while many of the weaker tribes sought their alliance for protection. Remnants of the Uchees, Alabamas, fire-worshipping Natchez, and other once powerful tribes may be seen to-day among the Cherokee and Creeks. None of these obliterated

* A paper read before the American Geographical Society by Colonel E. C. Boudinot.

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tribes, so far as I have learned, except the Natchez, had any tradition that they formerly lived in Mexico. The traditions of these civilized tribes are fast fading away; formerly a perfect system was observed in transmitting and perpetuating them. They number in the aggregate about 50,000 souls, divided, as near as can be ascertained from present data, as follows:—Whites, who have become members of the tribes by marriage or adoption, 5,000; negroes, formerly slaves of the Indian, but now, with the single exception of the Choctaws, incorporated as citizens of the tribes, 10,000; leaving but 30,000 Indians, properly so called; of these, one-half can speak the English language. Besides the civilized Indians, the savage tribes of Arrapahoes, Kiowas, Cheyennes, Comanches, Osages, and a number of smaller tribes, numbering altogether 20,000, have been assigned reservations in this Indian territory. Nearly all of these wild Indians have a language peculiar to their individual tribes, yet they all speak the Comanche tongue, which seems to be considered by them as the correct language of the plains. The Choctaws and Chickasaws occupy a very desirable portion of the Indian territory, bordering on the Red River. They are descended from a people called the Chickamicaws, who, according to tradition, were among the first inhabitants of the Mexican empire. These tribes speak the same language, and are no doubt the same people; though as far back as any definite history can be obtained concerning them, they have maintained a separate tribal existence. The Chickasaws were an aggressive and warlike people, while the Choctaws, though defending their country with desperate valour, rarely made war for conquest. It was a singular fact, that although, a century ago, the Choctaws could not swim, the Chickasaws excelled in that art, and took especial pains to teach it to their children. The Choctaws and Chickasaws in the time of De Soto, numbered 50,000 warriors; they number at the present day 20,000 souls, all told. The Choctaws, 15,000 strong, occupy a reservation of 6,688,000 acres in the south-east corner of the territory; the Chickasaws, 5000 in number, own a reservation of 4,377,600 acres, lying west of the Choctaw nation. Though each tribe has its separate legislature and civil government, neither can make any disposition of its lands without the consent of the other; a Chickasaw has the same right in the Choctaw nation that a Choctaw has, and *vice versâ*. All the nations and tribes in the Indian territory hold their lands in common, but there is a growing sentiment among them in favour of owning land in severalty. The Chickasaws have the honour of making the first movement as a nation towards this reform in the Indian policy. In their legislature of last fall they adopted a memorial, praying the government of the United States to allot them their lands in severalty, which have already been surveyed and sectionised. The Choctaws and Chickasaws are the only Indians that have abandoned the savage titles of chief and council; their chief magistrates are governors, and their legislative bodies legislatures. There are four high schools and forty-eight neighbourhood day schools in these nations; the Choctaws sustaining thirty-six of these at a cost of $36,500, and the Chickasaws sixteen, at a cost of $33,000. The Chickasaws send a number of their youth of both sexes to some of the best schools in the States at the public expense, making the total amount expended for purposes of education more than $50,000. There is a strong sentiment among the leading men of these tribes in favour of coming into the Union as a state.

The Creek and Seminole nations lie immediately north of the Choctaw and Chickasaw reservations: they speak the same language, and are in reality the same people. A portion of the Muscogee nation seceded many years ago, and established themselves in Florida, and ever since have maintained a separate nationality. These seceders were, by the Muscogees, called Seminoles, which signifies runaways. The Creeks, or Muscogees, number 13,000, and the Seminoles 2,300. The Muscogees were called Creeks by the English, because of the numerous small streams abounding in their country in Georgia. According to a tradition of the Creeks, they came from Asia. Crossing the Pacific, they landed near the Isthmus of Darien; from thence to the north of Mexico; and afterwards to their country upon the Atlantic shores, subduing the Alabamas, Uchees, and many other warlike tribes that ventured to oppose them. Whenever the Creeks decided to go to war in olden time, their principal chief caused to be displayed in the public places a club, part of which was painted red; hence the name "Red Sticks" given to hostile Creeks in the wars with them. Within the memory of Indians now living, the Creeks, numbering, as I have said, 13,000 souls, occupied an extensive territory in Georgia and Alabama; and although at that time about 50,000 strong, they were considered a mere remnant of a once mighty nation.

There is in the Creek nation a class of Indians called Uchees; they were formerly a distinct and powerful tribe until subjugated by the Creeks and incorporated in their nation. They were doubtless the original inhabitants of an extensive country near the Atlantic coast in the vicinity of the present city of Savannah. Unlike the Alabamas, Natchez, and other tribes whose names and languages have been merged in the Muscogee and Cherokee, the Uchees still retain their name and language. They have no tradition of ever having migrated from west to east. The Creeks but a few years ago showed a marvellous respect for the decrees of their judicial tribunals. When a person was arraigned for an offence punishable with death he was given a fair and impartial trial: if found guilty, he was sentenced to be shot at a certain state of the sun five days from that time: he was then dismissed, and he returned to his home unaccompanied by any guard whatever. He passed the time as usual among his neighbours, but punctually at the fatal hour he appeared voluntarily at the place of execution to die. There was no thought of escape, no writ of error, or motion for a new trial. To evade his sentence or be behind time on the fatal day was considered infamous. It must be confessed, however, that this nice sense of honour and respect for the law among the Creeks has been impaired by their advancement in civilization.

My own nation, the Cherokee, completes the list of what is known as the principal civilized tribes. We number at present, according to the official report of the Commissioner of Indian Affairs for this year, about 15,000, but this includes about 1,500 negroes, 500 whites, and 1,500 Shawnees, Delawares, and other Indians who have become a part of the Cherokee nation. We have some forty public

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free schools, and two high schools. The buildings of the latter cost $80,000 each. The Cherokees once had extensive settlements on the Appomatox River in Virginia, and formed the principal tribe in the Powhatan Confederation. The chief was a Cherokee. They are the only southern Indians who count as high as one hundred by numeral names; all other Indians count only to ten; after that they add units, as ten-one, ten-two, &c. The Cherokee calls 20 two-tens, while the Creek calls it ten-twos. Among the Cherokees, as well as among all the southern Indians, there is a class of men called conjurors, who are held in the highest estimation by the common people. They profess miraculous powers. In times of disastrous droughts the Creek conjuror still exercises his mysterious incantations to produce rain, and generally succeeds in producing it, by continuing his ceremonies until the clouds are propitious; but the honourable profession in olden times had its embarrassments and responsibilities, for, should the conjuror fail to produce rain after a fair trial, he was put to death as an impostor, and should he bring too much rain he shared the same fate. Cities of refuge, similar to those of the Jews, were recognised sixty years ago among the Cherokees. Within their sacred limits no blood could be shed. "The beloved man," or man of wisdom and peace, was absolute ruler therein. Even an enemy at war, if found within the peaceful boundaries, was entertained with the greatest hospitality and dismissed without harm.

The Cherokee language seems to be distinct and independent of all other Indian tongues; it is smooth and soft, and when spoken, by females especially, sounds most musical. There are but two words in the language which require the touching of the lips to pronounce; those two words mean *water* and *salt*, and have the sound of the English letter M. The Cherokees are the only Indians who have an original alphabet for their language. The Creeks and Choctaws use the English characters, but the Cherokees have an alphabet of their own, invented by a Cherokee who could not talk the English language. His name was Sequoyah. This inventive genius—the Cadmus of his race—had none of the lights of science or civilization to guide him; but conceiving the idea of enabling the Indian to talk on paper, as he one day saw the agent of the United States doing, he shut himself up in his cabin for more than a year, and endured like many other reformers and inventors, the gibes and jeers of the ignorant and thoughtless, who all pronounced him crazy, until he came forth with a perfect alphabet, and established his claim to be ranked among the first inventive minds of the century. He traced the characters of his alphabet on chips and pieces of bark. This alphabet was invented in 1822; it consists of seventy-eight characters, and, strange to say, is most easily learned by children. Soon after the Cherokee alphabet was perfected, type was procured, and a newspaper established, called the *Cherokee Phœnix*. My father was the first editor of that paper. One half was published in the Cherokee language, and the rest in English. After the Cherokees became settled in their present homes, the paper was continued, under the name of the *Cherokee Advocate*, and is still printed in the Cherokee and English languages, so that it may reach all classes of the people. It is now edited by my brother, Wm. P. Boudinot. In the north-east corner of the Indian territory, are situated the remnants of those once powerful and warlike tribes the Senecas and Shawnees. Most of the latter are of the Cherokee nation, but some still have a separate reservation east of the Cherokees. The Modocs have also been recently removed to this part of the Indian territory.

One great error in the legislation of this country with reference to the Indians, for the past forty years, has been that no discrimination has been made between the civilized and savage. The Cherokee or Choctaw Indian, who graduates from your best colleges, studies a profession, and takes respectable rank among your ministers, doctors, and lawyers, is still in the contemplation of your laws, just as much of a savage as the warrior of Red Cloud's band, whose Alma Mater is the bow and scalping knife. The first law of the country to regulate trade and intercourse with the Indian tribes was enacted in 1790. At that time no Indian tribe approached civilization, and the law was uniform and proper. But since then the Cherokees, Creeks, and Seminoles, Choctaws, and Chickasaws have become civilized. More than a generation has passed away since they exchanged the bow for the plough, and their superstitions and traditions for the Bible and school-book. Yet, while they have emerged from the darkness of barbarism to the light of civilization, no one could discover it from the character of your laws. It would be out of place for me on this occasion to discuss the Indian question: but in connection with the statements I have submitted concerning the civilized Indian of the Indian territory, I venture to give very briefly my own ideas of the proper policy to be pursued in relation to them. It is this: The passage by Congress of a territorial bill for the Indian country which will provide for a survey and sectionizing of the territory, the establishment of United States Courts, a delegate to Congress, and all the necessary officers of a strong civil local government for the protection of life and property, which will declare at least all the civilized Indians citizens of the United States, authorize the selection by them of 160 acres of land for every man, woman, and child; the same to be inalienable for a term of years; the lands remaining unappropriated to be sold by the United States Government to actual settlers at not less than $1.25 per acre, and the funds accruing to be invested for the benefit of the Indians, the interest of which should be used in great part, if not entirely, as an educational fund. But the plan to organise a civil government over the civilized Indian tribes, though solemnly agreed to in the latest treaties which have been made with them, is denounced by some as a job, and as being in the interest of railroad corporations. Certain railways have grants of land through this Indian territory conditioned on the extinguishment of the Indian title: and it is loudly proclaimed that the organization of a civil government by Congress will extinguish the Indian title. I have prepared a bill which is now before the appropriate committee of Congress in strict conformity to the treaty, for the establishment of a territorial government over the Indian territory, in which I have endeavoured to obviate the objection. The 17th section of this bill reads as follows: "That nothing in this act shall be construed as extinguishing or affecting in the slightest

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degree the Indian title to any of the lands of any of the nations or tribes within the said territory of Oklahoma; nor shall anything in this act be construed as impairing or interfering with the rights, privileges, or jurisdiction of the tribal governments within the said territory." The tax-gatherer is sent to the civilized Indian tribes by the authority of your Congress and your courts to levy tribute for the support of this great country, in spite of the solemn treaty which stipulated it should not be done. Is it not right and just then, that we should have some voice in your government when you compel us to contribute to its support? Then make us citizens of the United States, clothe us with the prerogatives of such, arm us with the power and rights of American citizens. Depend upon it, the civilized Indian will bless you, if he but understands that he is elevated from the degrading rank of a ward and subject to the proud position of American manhood and citizenship. You struck the shackles from the limbs of 4,000,000 slaves, and, while still dazzled by the full blaze of liberty, you girded them with the armour of American citizenship and bade them protect their new-born rights. You transformed the ignorant slave into an American citizen. Be as just and generous to the civilized Indian. His title in common is insecure. Give him a better one in severalty. He is subject to your laws and to your courts; give him a voice in making the laws which are to govern him, and the right to sit upon a jury which is to try his countrymen. He is subject to your revenue laws, and pays taxes to the support of your government; give him that representation which should go hand in hand with taxation. Give the Indian those equal rights before the law which are conceded to all other people. Arm him with the powers and privileges of an American citizen. Give him that title to his land which he can protect and defend. Then, and not till then, will he have a country which he can call his own; then will he be possessed of land which is his indefeasible property; then will he have a home where he can rest his weary feet with no dark forebodings of the future.

SIGN POSTS ON OCEAN'S HIGHWAY.

BONE-CAVES.

"The thing that hath been, it is that which shall be; and that which is done is that which shall be done."

HERE and there, beside the highways and byeways of populous earth, man erects sign-posts to guide the stranger. Time, with its relentless wing, occasionally destroys these guides, while idlers, in practical jokes, frequently obliterate them with mud or with small shot, causing poor travellers to lose their way.

Ocean, more liberal than man, has for ever erected, and will for ever erect, magnificent finger-posts beside his great highways and his little footpaths; so that those who run may read. Here also time obliterates the reading, and idlers, with their random shots, so mystify the records that the road is difficult to find.

Man restores his illegible finger-posts; ocean can no more return to do so; but if our text is true, if that which is forms a clue to that which hath been, then we have clues to restore the reading on this sign-post, so that future travellers may not miss their way.

The idlers we refer to are very different in character; he who shies mud, or fires his gun at his neighbour's finger-post, does it out of sheer mischief, because he is idle. He who takes a shot at old ocean's finger-posts, does it because he is not idle, he has reached the end of his journey, he has got other things to do; so, sooner than go back again, he takes a snap shot, thinks he has hit the mark, and, satisfied with the road he has found, leaves his record behind him, and hurries on to other journeys. Idlers though they are for not following their clues to their legitimate ends, we cannot refuse them the credit of being very industrious travellers on many roads, and while thanking them for uncounted correct interpretations of nature's sign-posts, we still call them mischievous idlers for leaving the bone-cave inscription misinterpreted.

It is a very curious thing that misinterpretations should hold their own so long; it looks as if travellers in general followed blindly the tracks before them. We take the liberty of selecting some, who, with no knowledge of parts of the subject, have not only lost their own way, but by their authority have led others astray; men who have not stopped to detect the contradictions of their guides, or seen the quagmires before them.

At the late meeting of the British Association at Bradford, Professor John Phillips, F.R.S., President of Geological Section, is reported by the *Geological Magazine* for October, to have said, "Keeping our attention on Pleistocene Geology,* we may remark that the famous cavern of Kirkdale, with the equally celebrated rock-den of bears and hyænas at Torquay, receives no small help toward clearing up the history of mammalia in Britain from the explorations now going on in the limestone cliffs not far from this place of meeting."

The next man we come to was a strong practical geologist, who not only followed the wrong trail himself, but called out to those who were on the right track to come back. Hugh Miller told his own tale too well to take it from him. In his fair work, *The Testimony of the Rocks*, p. 285, he said, "The group—that which immediately preceded the animals of our own times, and included not a few of the indigenous species which still inhabit our country—was chiefly remarkable for

* The *Geological Magazine*, No. 109, reviewing Sir Charles Lyell's last edition of the *Antiquity of Man* says, "The skeleton is all but perfect," skeleton and soil were "stained red by oxide of iron." Extinct animal remains were found with one skeleton, and at a higher level than another skeleton near Mentone, and it is "not improbable that Dr. Rivière has brought to light a complete human skeleton of Palæolithic age." These skeletons were ornamented with shells and teeth; they were therefore buried in comparatively civilized times. They were nearly perfect—they had not therefore been subjected to the water-carriage that had placed the other bones near or on the same sites. These animal bones were therefore deposited by water, while the sites were under water; the human bodies were buried when these sites were dry, when ordinary denudation had brought the cavities to the notice of man. If man lived in the "Palæolithic age," we may infer that animals also existed at the same time, that they died, and that their bones helped to make our limestone mountains. If, then, Palæolithic means anything, what does Pleistocene mean? Professor Owen, in his *Palæontology*, 2nd edition, p. 5., places the mammalian bone-beds below the oolite, and the lias next to the upper new red sandstone; at p. 445 he places carnivora at the lower end of the Eocene. The whole of the Mesozoic epoch thus coming between them. It by no means follows that because man has not found the remains, animals did not exist far into the Palæozoic age, giving their bone to the magnesian and the mountain limestones.

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containing many genera, all of whose existing species are exotic. It had its great elephant, its two species of rhinoceros, its hippopotamus, its hyæna, its tiger, and its monkey; and much ingenious calculation has been employed by writers, such as Granville Penn, in attempting to show how these remains might have been transported from the intertropical regions during the flood, not only to Great Britain, but even to the northern wastes of Siberia." Now we must see where Mr. Penn had gone to that he was thus roughly called back. He had said that animals or their remains might be removed by water from one region to another; it is an undoubted fact that they have been so removed. Hugh Miller knew it very well, but he was vexed because Penn, forsaking the track that Miller was on, "gets over the difficulties of the cave, which is hollowed, I may notice, in a limestone of the oolitic series* enclosing the ammonite and belemnite, by asserting that its mammaliferous contents may *be somewhat older than itself!*" The note of admiration and the italics are Miller's. He goes on calling out to Penn, because he held that the limestone existed as a "mere pulp at the time the intertropical animals came floating northwards: they sank into it; the gases evolved during putrefaction blew up the plastic lime above them into a great oblong bubble, somewhat as a glass-blower blows up a bottle; and hence the Kirkdale cavern and its gnawed bones, and its amazing number of teeth." Hugh Miller trusted implicitly to his pioneers: he did not know that gases do blow up mud lumps on the Mississippi—the path was fashionable, and folk were gullible; but we will allow him to show how he lost his way. At p. 289, talking of antlers, he says, "the fractured specimens are generally found in caves, and show marks of the teeth of ossiverous hyænas by which they had been gnawed; thus at the same time revealing the mode in which they were introduced into these caves, and *proving the contemporaneous existence in this island of both kinds of mammalia.*" On turning to p. 281, we find Miller calling a few words, quoted from Goethe, a most instructive passage—"These mountains had certainly once been covered by waves." If this was true of high hills in Germany, Miller did not see that his cave hills of Britain must also have been under water, he did not know that hyænas do not use hartshorn oil, and he had neither the beginning or the ending of his oolitic group; while neither he or Professor Phillips seem to have remembered the rule, that dust is buried chiefly in contemporaneous dust. Miller would have been astonished to find that Mr. Penn was nearer the right road than himself. We place Baron Cuvier and Professor Buckland in the front rank of those pioneers who have misled so many by their snap shots at our sign-post. The facts given by both are very similar, but we quote from Cuvier: "The general circumstances of all these caverns are extremely similar; the hills in which they are excavated resemble each other in their composition; they are all calcareous, and produce stalactite in abundance. . . . . The bones are nearly in a similar state in all these deposits, detached, scattered, and partly broken. . . . . They yet preserve their genuine animal nature, and are not much decomposed. . . . . A hardened earth, but still liable to pulverize, impregnated with animal matter, constitutes their natural envelope. . . . This is in many instances interpenetrated by, and covered with a crust of stalactite of the finest alabaster." Excepting some recent bones on the surface, "all were evidently interred in the same manner, and by the same agent." Some of the bones were a little worn on one side, but we "can only account for the vast accumulation of bones by the agency of beasts of prey." These beast were hyænas.

Miller was led into his hartshorn oil, and Phillips into his rock-dens by these pioneers. We have the reports of cave committees read at the Bradford Meeting of the British Association, giving us a few abstract facts observed at Kent's Hole, which will help us in restoring the old sign-post to its proper position. While thanking the committee for the clues given, we must say that if this committee had followed up these clues to their legitimate conclusions, they must have been much more satisfactory than we can hope to make them. We select the clues we require from these reports, from the *Times*, and place them in the order in which we propose referring to them:

No. 1. Bones, chips of bone, and teeth were found in granular stalagmite.

No. 2. Films of stalagmite invest some of the bones.

No. 3. Some of the bones are gnawed.

No. 4. Some of the bones are rubbed.

No. 5. No skeleton, or considerable part of one, was found.

No. 6. The cave earth is mixed with red clay.

No. 7. Breccia is found inside the cave.

No. 8. Bones in this breccia are comparatively few.

No. 9. These deposits are without stratification.

Each one of these abstract facts leads to separate paragraphs of nature's vast inscription. We do not pretend to read them so accurately as to restore them without some omissions, and some errors; there are minor parts of the great laws before us hard to follow, and leading into inextricable confusion if a link is missed; all that we can hope to do is so to restore the old record, that the sign-post may be legible for the future; and we may express a hope that when the clues are followed out sufficiently for this purpose, others, with a more accurate knowledge of the workings of matter, may be able so to supply our omissions, and correct our interpretations, as to leave the inscriptions indelible for the future. We offer no controversial theories, we follow the facts placed before us to their legitimate conclusions, and we venture to say that any one who has watched the workings of natural laws as we have, must of necessity arrive at the same conclusions as we do.

No. 1 shows us bones, chips of bones, and teeth scattered about in coarse granular stalagmite. What is stalagmite? We prefer that an authority should answer this question. G. F. Richardson, in his *Geology*, tells us that "water which flows through limestone rock has the power of dissolving a portion of the limestone." As the water drips it forms a stalactite. "When the supply of water, holding lime in solution, is too rapid to allow its evaporation at the bottom of the stalactite, it drops to the floor of the cave, and, drying up gradually, forms in like manner a stalactite rising from the ground, which, for the sake of distinction, is termed a stalagmite." Our committee found this stalagmite coarse, Cuvier found it fine: as

* See note, p. 95.

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a rule these lime drippings follow the nature of the mass which supplies them. Hugh Miller puts these caves down to the oolitic group of the Mesozoic epoch—the formations of this group were often granular—but we shall see presently that these cave constructions can claim no particular date, though they may bear the character of a group, not from unity of time, but from unity of material. This stalagmite dries, and crusts rapidly; the teeth, chips of bones, and bones were buried in it: consequently they must have been there before they were buried. Foxes bury such portions of their dinners as they cannot eat at a sitting. Hyænas are not so provident; they are, however, sagacious brutes after their fashion; they do not carry about teeth of any sort—the tooth of an elephant would not afford skin enough for a meal. Hyænas do not dine in their dens, neither do they die there. Captain W. Havelock, two other officers of the 4th Light Dragoons, and ourselves once killed a hyæna in his den, and left him there. The usual dying place of these beasts is the water side, where the next rise of the river carries off what is left of their remains. Hyænas only eat bones when they can get nothing better. After they have eaten a bone, a small heap of gritty fragments may be found on each side of their mouth. Of all the dens and jungle layers of these beasts which we have visited, we never found a bone in or about them. We have found plenty of bones in the vicinity of tigers and cubs. The conclusion to No. 1 is that the teeth, chips of bone, and bones, were not deposited where found by hyænas or by any other wild beasts.

No. 2 follows naturally on No. 1. As the lime-water drops on the floor of the cave, it goes on percolating as long as the floor allows it. Everything resting on that floor is, therefore, liable to be invested. The droppings of this incrustation continue as long as water percolates the rock, or while there is matter for it to carry away. This fact proves that the bones were *in situ* before they were covered by the stalagmite.

Some of the bones are said to be gnawed in No. 3. If the marks on these bones are teeth marks, which we very much doubt, it is quite possible that they were gnawed before they were deposited in their present locality. We shall see by and bye that when they were deposited the whole site was under water, but when that water retired, leaving the place high and dry, nature began to denude the mass; then wild beasts may have entered this cave;* they may have taken a liking to the well-preserved, gelatinous bones, exhumed some of them, and gnawed them. As hyænas seldom gnaw bones without breaking them, we are not inclined to give them credit for the marks. If these are teeth marks, all we can say now is, that the bones were not brought into the cave for dinner.

No 4 is a very important clue, it changes the depositing agent, and rubs off many difficulties. Some of the bones are rubbed—how, and by what? They are rubbed on one side only, and by one cause. It is quite true that pigs, cattle, hyænas, and many other creatures love rubbing-posts. It has been suggested that Druids lived in these caves, and used the bones as we use huckabacks; but how were those bones rubbed that rest in the cave earth, and the stalagmite, with no signs of exhumation since they got there, and were covered by the lime films? The rubbing is on one side, the convex side, on which the bones must have rested when moved along by a water force. If they were moved along over sand or gravel, they must have been rubbed precisely as they are rubbed; if they had been forced by water over a slope of breccia, they must have been marked as if they were gnawed by teeth, with this difference, the teeth would have broken them, while the water need not have done so. The hyæna does not waste time about a bone: he fulfills the proverb, of which he may have been the originator, "he makes no bones of them." If there is anything good inside, he cracks it if he can, and eats it; but ribs, shoulder blades, and jaw bones, are left for the minor animals that generally look over the remains of his feasts. Jackalls, foxes, rats, beetles, worms, with multitudes of birds, leave very little under ordinary circumstances; but none of these waste time in rubbing bones. None of these creatures, except the fox and beetle, lay up stores for to-morrow, so that no rubbing is done by dragging a rib behind them. The bones and teeth are scattered about; no

* In *The Antiquity of Man*—second edition, 1863—Sir Charles Lyell notices many cases of bone breccia, with stalagmites entire and broken. He shows that these, and the implements of man's making found with them, must have been introduced to the caverns before the stalagmite flooring was made. He shows that bones have been found in carboniferous limestone, and in the old Devonian. He shows how liable limestone is to wear away under the influence of water percolations, and that fissures thus made, lead water and all the miscellanies that it carries into subterranean cavities made by water by slips and faults. There can be no doubt when bones are thus carried into the interior of limestone masses, that they must be covered over and preserved by stalagmite matter, when it drops upon them, exactly the same as if these bones had formed the nucleus for the lime formation to rest upon. As Sir Charles Lyell had allowed the water carriage, the breccia, and the rubbing or rolling, we were scarcely prepared for what he says in the last edition of *Principles of Geology*—that a certain condition "does not invalidate the generality of the phenomena pointed out by Dr. Buckland." Sir Charles is guarded on the subject; he admits the wild beast cautiously:—"I do not doubt that bears inhabited some of the German caves, or that the cavern in Kirkdale, Yorkshire, was once the den of hyænas. The abundance of bony dung associated with hyæna bones has been pointed out by Dr. Buckland, and with reason, as confirmatory of this opinion." As hyænas do not, in a wild state, dirty their dens, as their droppings become hard after a short exposure to the sun, as they float in water till saturated, it was as easy for them to be washed into cavities as for the heavier bones. There is, however, another view of this point. Certain bone fissures and caves have had openings for unknown periods; wild beasts or tame may have got in to eat the bones, and their droppings would have assumed an osseous character. Sir Charles Lyell seems to think that a voyage in the ocean must have destroyed bones, because there was nothing to cover them: anything placed in a sandy or muddy tideway is soon covered over. Our loosened soil gives mud in plenty now, and the bones of old gave plenty of lime. Sir Charles tells us that old geologists supposed, "that all limestones have originated in organic substances;" he thinks they are sent up by springs, but springs may reproduce organic matter in new forms. Can we not credit the great animal kingdom with giving some bones for preservation, and some for solutions? We credit microscopical creatures with vast formations, and the beautiful results of animal labour may be seen in the wondrous marbles gathered to adorn the Italian churches, giving back to the houses of God some of that splendour given by His laws: laws which allow nothing to be lost, but preserve the most delicate tints, collected by His creations from the air and the water-shaded matter; from those creations transferred to the dust again, and, as that dust, either going through the undiscovered worlds of transmigration of matter, or building up solid pyramids by ocean's highway. In all places, and in all positions, inviting by their beauty and their consistency, fresh worshippers to the glorious laws of creation. —*H. P. M.*

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animal of any sort could have done this, no one spot is even used as a cemetery by wild beasts, though they do perish in vast numbers at salt licks, and at favourite springs, but the bones do not get rubbed there, though they do retain the character of entire or broken skeletons. There is but one conclusion to this clue. Water placed the bones where we find them; water carried them, and rubbed them in the carriage. If it is asked why all are not rubbed, we reply, the bones travelled various distances, they were conveyed by varied forces, some along the bottom, some without touching it. This exemption of some from rubbing is direct and conclusive evidence of irregular conditions of water-carriage; no other cause could have produced these conditions in the bones, and the legitimate conclusion to this clue is that the rubbing was caused by water forces, as they washed the bones along on the water bed.

We come to a very interesting fact in No. 5. No skeleton, or considerable part of a skeleton, was found in Kent's Hole. Carcasses had not been deposited entire; causes had operated to break them up, to split, and to rub the bones. The questions are what were the causes, and under what natural laws did they act?

When animals are killed by beasts of prey, the flesh is very soon consumed, and the skeleton very soon falls to pieces; various animals and birds drag the remains about, so that, in the course of eight or ten days, the carcass of an ox has vanished, and his bones are scattered about. When animals die of old age, or by accident, there are generally other creatures to consume them, and a similar fate follows the skeleton. If animals fall into crevices, or mud, and die there, the skeletons are often preserved for a long time. The exclusion of atmospheric influences seems necessary to preserve any organic matter. The bones under consideration are preserved in a wonderful manner;* they are often gelatinous, and fresh, but they are scattered about and broken. As they are neither sun-dried or decomposed, they did not remain in the open air long after death. When hyænas break bones they eat them. There is, however, an agent acting under a natural law, which inevitably breaks, scatters, and deposits, in some shape or other, all bones, and skeletons entrusted to its care. As the preservation of these remains is due to matter deposited by the same agent, it seems most probable that all the conditions in which these remains are found must be due to different actions of the same law. There are two catastrophes which overtake wild animals in the midst of their careers: the quantity of bones in similar conditions in different places render it likely that one of these caused numerous deaths at different times. One is a long drought, the other is repletion by fresh-grown herbage; in the latter case, the carnivora do not necessarily die, but as their bones are found in caves mixed with herbivora, we are inclined to attribute the death of the owners of all these bones to want of water. In this case the dead bodies would lie about the beds of rivers, or any places where they had hoped to find water. As heavy rain generally falls after a long drought, all these dead bodies in the ravines and water courses must have been washed down stream. If the skin of a carcass is entire when it is floated by water, the body remains on the surface till decomposition, or other causes, admit the water; when the skin is not entire, the carcass sinks. In this case the limbs are soon dismembered and broken up; in the other case, the remains go on farther till the same fate overtakes them. In cases of drought every little stream sends its produce to the great river, so that when the rain falls, the contributions are in all conditions and in all quantities. In whatever conditions these remains were overtaken by water they must be buried eventually, the condition at the time of burial depending entirely on the character of the waters that conveyed them. Under no circumstances does a skeleton remain together, even for a few minutes, in running water;* when once broken up, the light bones do not necessarily sink to the bottom, the heavy ones do; those that sink travel slower than those which do not; so that, in a few moments, bones of the same creature may be far apart; those that are forced along the bottom are rubbed more or less according to the smoothness or roughness of that bottom, and those that are carried to a quiet burial place are buried without delay by the thick solutions of the long delayed rainfall. As the waters carry off light surface matter to-day, so they must have done in all time. As the surface-matter of to-day belongs to man's orderly world, so the surface-matter of yesterday belonged to the disorderly animal kingdom; the bones of to-day are used, those of yesterday were scattered about on the face of the earth, where accidental or natural deaths left them. We can scarcely understand now the vast quantity of bones that must have been left to decompose in those times; but as surface-matter produces mud now, so surface-matter must have produced lime then. The lime solutions of those days buried what they found to bury as mud does now; as lime solutions are used to preserve things now, so they must have preserved things of old. Cuvier mentioned the leg-bone of a snipe as having been found amongst mammalian cave bones; the *Geological Magazine* for September, 1873, mentions remains of birds, frogs, and fish as having been found amidst other bones in a cave of Kircudbrightshire. Can any one imagine any beast of prey taking the trouble to carry such dainties into his den and leaving them uneaten? If there is any limit to the range of Pleistocene mammalia, if there is any supposed boundary to the oolite formation, if any defined habitations for the beasts who once owned the bones before us, we deliberately say that all these points should be considered again,* for we can find but one conclusion to No. 5—water placed the bones as we find them, water buried and preserved them with its lime solutions. Nature provided the materials, while the never ending, still constructing, still consuming law of water force was at work upon them, breaking up skeletons into fragments, as we break up wood, and reducing bones to pulp as our paper-mills reduce rags to the same condition. Thus the nuclei and the lime solutions were prepared, and thus many caves have been formed and left by nature as we find them. We do not propose to dwell on this point; there are several causes for red earth, red marble, and red granite. We accept the explanation of Baron Cuvier that the redness of the bone-cave earth is due to animal matter.* When

* See note, p. 95.

* See note, p. 95.

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animals die in great quantities, the earth around is saturated with their liquids; a heavy, sudden fall of rain not only washes off the remains, but the blood-stained mould as well. The colouring of the cave earth is the unavoidable result of the death, and speedy burial of the remains of the animals that gave their bones to fill these sites. We have now come to a very important fact. There is, says the report, much breccia, and this "must have been derived from outside the cavern, as no rock capable of supplying its materials exists in the cavern hill, while they might have been obtained from loftier adjacent eminences." Breccia is formed in two ways, either by crumbling up in its descent from high places, or by breaking up from rock masses rolling down water-courses, but not carried far enough to wear off their corners; as this breccia came from adjacent eminences, or from rocks of a similar composition, we conclude it was placed where it is found by water action. As this action is proved by the next fact, we place them together.

No. 8 tells us that the bones and teeth in the breccia were fewer than in the stalagmite—as the current was strong enough to break up rocks, by rolling them on from adjacent spots, it was strong enough to carry on bones and teeth. The bones and teeth found in the breccia were most likely brought by the same waters that brought those in the stalagmite. The latter formed heaps and banks, because there were obstructions to the current; the former did not fall in the way of the eddies and whirls formed by the obstructions, but remained in the bed of the current with the heavier breccia; as the current was stronger in its bed than on its sides, it carried on most of the light materials, leaving only such as accidentally got stopped by hitching between stones, or by being covered up by them. If it had not been for these teeth and bones, the cause of the presence of breccia might have been doubtful; as these teeth and bones are found in it here and there, there can be no doubt that all were lodged by a stream of water once running over the site. It is, however, by no means impossible that this stream may have run through the place after it was subjected to the obliteration of time,* and that the relics now found in the breccia were taken out of the stalagmite and cave earth, for stalagmite does not form where water runs. Our history does not enter here into these after doings, while they tend to confirm the erection of the cave sign-post by the side of ocean's old highway.

We now come to the last clue, on which we must dilate a little to make its history intelligible. No. 9 tell us that the deposits in Kent's Hole are without stratification—the deposits alluded to seem to be the bones and the cave earth. This is one of those beautiful illustrations of the absolute adherence of water and matter to natural laws, while the water that contains that matter seems to throw the whole into confusion.

Stratification is considered as the certain evidence of water deposit, but the absence of stratification or apparent stratification is not only a certain proof of water deposit but of the condition of the waters that left it. Every one who has read with attention the volumes of water open before him will comprehend the picture that we wish to delineate. All water that has in it matter for deposit, leaves it as stratified matter under ordinary circumstances; while under extraordinary circumstances the same matter is left unstratified The cause of this does not rest with the matter or the water, but with foreign substances that interrupt the water run. The obstacles alone cause deposits to assume their well-known chaotic confusion; yet all is done by natural laws, always at work, and no other laws could have left the materials in Kent's Hole as they are left.

Many of us have stood on boulders in tide-ways watching the waters rushing in between the rocks; many of us have walked over these boulders, when the tide has ebbed; we have seen hollows scooped out under some, sand heaped up behind others, shells, gravel, shingle behind others; no two of these tails are of similar shape, material, or quantity; the more we look the more we admire the chaotic confusion caused by the patch of boulders around us. The same results happen in the beds of rivers. During floods, boulders or other obstructions find resting-places on the confines of the stream bed, every one of these obstacles divert the current, forming whirls, eddies, and back waters, according to shape, size, and position. As the flood subsides, the solutions or the materials under the influence of the stream settle down where they can; the obstacles form harbours of refuge, a tail is formed behind each, except where crossing currents refuse a rest. When the river resumes its usual channel, leaving the obstructions and their tails high and dry, we can walk amongst them, admire the utter confusion of shape, size, and material, and see by these very signs the force and direction of the water that brought the varied materials, and left them there.

Man has looked at these drift patches; he has called the boulders erratic, as if boulders could be otherwise than erratic; he has called the clays, and other deposits with them, glacial deposits; but there is no law under which materials carried by ice could assume the condition in which we find these boulder clays, unless they had been placed at the disposal of water on being released from the ice; so that, even with ice carried materials, water is often left to place them.

We have studied these chaotic deposits forming and breaking up; we have seen them re-forming in changed conditions, not as small tails behind the little boulders of our English streams and tide ways, but as great collections of matter under the lee of vast boulders. We have seen slabs in these collections scratched and striated, the hard rock of the river bed grooved and channelled merely by the force of water moving the sand and gravel along its face. The material, eroded from river bed and from boulder, reposed in stratified condition close by the side of the chaotic masses, resting amongst the boulders, in apparently unstratified condition. There was no other power but water to produce these results. So it was in Kent's Hole; obstructions existed there when the waters flowed over the site, back waters, eddies, and whirls were caused; the bones, the teeth, the unstratified materials all sought harbours of refuge; the obstacles afforded them and the materials of varied sorts sunk down to rest in the places where we now find them, in the very condition and character observed by the committee.

The only legitimate conclusion to this clue, is that the absence of stratification is proof of deposit by

* See note, p. 97.

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water currents, thrown into confusion by obstacles in those currents, which once flowed over the site of Kent's Hole. As our conclusions are spread over some space, it will be as well briefly to recapitulate them.

Beasts of prey did not bring the bones or teeth into the places where they are now found. These teeth and bones were *in situ* before they were covered by stalagmite; they were rubbed, and probably marked, by water action; they were placed where they are by water. The red clay is evidence of animal matter. The breccia, and the few bones and teeth, tell of varied water forces, and the deposits without stratification are certain proofs that water covered the whole site, while the bones and teeth were being deposited, and while the limestone rocks were forming above them as coverings and as preserves.

There is only one observation that we wish to make on the report of the Settle Cave Committee. It says—It is "clear that the hyænas and other creatures found in the Pleistocene stratum, could not have occupied the district when it was covered by ice." When was this Pleistocene period? Some have put down the supposed glacial epoch at 80,000 years ago; some one has lately proved to his own satisfaction that we were all frozen over 27,000 years ago. The difference between these periods—53,000 years—is really of no consequence to bones, when once hermetically sealed; but it seems of some importance to those who wish to fix a date for a change of climate in these latitudes, as well as for those who desire to limit certain animal productions to one group, and the formation of limestone to one system. We respectfully place all these gentlemen in the list of those idlers who take snap shots at nature's sign-posts; for want of time to follow the clues, they hold to their legitimate conclusions.

So much of fact has been mixed up with imagination in the interpretation of these bone-caves that the original monogram is nearly obliterated; we have shown, from facts connected with them, how erroneous some of these interpretations must be, and we now propose to deduce from these facts, and from our own observations of natural laws, a brief history of the erection of some of these curious and interesting sign-posts by the passing waters.

Our own experience extends only to fifty years. We have studied nature as she has opened her pages to us, and we know that that which is done, is that which hath been done, so that, with a change of material from that which in our short time has been at work, we proceed to our tale.

General System of Cave Formation.

We go back to those days when this earth was the animal kingdom; when innumerable animals lived, multiplied, and died; when rain fell upon earth, and when droughts occurred; when there were times of repletion, and times of famine; when creatures died in numbers under the influence of both as they die to-day; when the birds of the air and beasts of the field flocked together round the last water pool of a district, gathering and increasing in numbers till the last drop of water was gone; when the weak ones laid down to die, and the strong ones roamed about in hopeless wanderings; and when the beasts of prey revelled for a while on their plentiful supplies. The hyæna is a dry-living creature, the bear a very abstemious one, at seasons; but water is as necessary to them as it is to the camel or the long enduring wolf, so at last all sunk down beside the dead herbivori and their possibly gnawed bones, bestrewing the river bed and the neighbouring ravines with their emaciated carcases, with no creature to gnaw theirs. As rain falls heavily after long droughts now, so it has fallen in all times. The ravines, the river beds, were full of water; the dried-up skeletons were washed away—skin, muscle, and well-knit joints were of no avail before the water king. Rolling down the tearing stream skeletons fell to pieces, bones were broken, teeth fell out of the shattered jaws; some bones were triturated into fine, some into coarse solutions, as the waters rolled on towards their ocean goal. Here and there in the river courses, resting-places were found for some of the burdens; some wandered on to the estuaries, and were handed over to the tidal currents. There the thick solutions of animal calcareous matter, mixed with the thick solutions from the remains of ocean life; there the bone of the elephant was dashed to pieces by the side of the ammonite; and here both were buried in contemporary matter, though not necessarily side by side.* As water is the great discriminator of weights, so materials of similar characters settled down together; eddies, whirls, and back-waters build up heaps and banks of the materials entrusted to them to-day, and so they built up banks and heaps of the bones that fell to their share in old times. When currents calm down, and waters become still, their solutions find time to settle, and they cover all that is below them. On the sea beds, they formed sheets above the bone heaps, as they have formed a sheet over the mud at Ryde; as this is growing still, so the sheets grew, season by season, over the heaps and banks below, growing thicker and thicker. As artificial cement soon becomes firm and self-supporting, so these formations of nature sustained themselves; decomposition of some matter, and the sinking of other matter below, took away in time the centering on which the sheets had rested. No sooner was a space left between the roof and the matter down below, than the dripping of stalactite matter began, and, dripping down upon the still subsiding heap, interpenetrated the mass and individual bones. We have seen that this stalagmite may be fine or coarse, in some instances it has been found cracked and broken up, showing that it had infiltrated the heap of bone matter before it had done subsiding, thus adding another proof, if wanted, of speedy burial by coeval matter.

Our cave is thus formed without any infringement of natural laws; we have followed the facts, represented as now existing, to their legitimate conclusions. We have not required the gases of Penn to blow up the pasty lime into a great bubble, but we have adopted his water-carriage, not in the period of the Noachian deluge, but at any time when bones were plentiful, and floods carried them off. Our sign-posts are at various elevations; they were formed at various depths, and as old ocean left them where he made them, they became exposed at varied times. There are places on England's coast where the sea occasionally exhumes them. Ordinary denudation has introduced many caves to the notice of animals, and they have been tracked to the caves by man. He has excavated these caverns,

* See note, p. 97.

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and has turned the cemetery of old bones into a dwelling place or a burial place. The relics of man, and of the animals immediately preceding him, do not necessarily belong to the same periods as the broken, rubbed, and indented bones in the cave earth and stalagmite.*

We have no date for our chalk hills, for coral mountains, for limestone rocks, or for basaltic columns; we place them in groups, systems, and epochs. We have taken the liberty, on our own authority, to suggest a reconsideration of the periods in which the bone-cave limestone rock was constructed, or in which the animals lived, whose bones are found in them. We are not solitary in our views of such geological division. Everything in nature merges by slow degrees into that which is next to it on either side. We support this by a few words of Professor Sterry Hunt, from the *Geological Magazine* of October, 1873. "The attempt to establish geological divisions or horizons upon stratigraphical or palæontological breaks must always prove fallacious. From the nature of things, these, whether due to non-deposition or to subsequent removal of deposits, must be local; and we can say confidently that there exists no break in life, or in sedimentation, which is not somewhere filled up and represented by a continuous and conformable succession. While we may define one period as characterized by the presence of a certain fauna, which in a succeeding epoch is replaced by a different one, there will always be found, in some part of their geographical distribution, a region where the two faunas commingle, and where the gradual disappearance of the old before the new may be studied. The division of our stratified rocks into systems is therefore unphilosophical, if we assign any definite or precise boundaries or limitations to these." As our nummulites, our foraminiferæ and our diatomaceæ are buried in coeval matter supplied by their own kith and kin—as the fossils of our lime formations are buried in matter given by their families, why should we deny to our mammalian bones a burial by matter partly or wholly formed from their own bodies? We will leave that question as a puzzle for anyone who likes to take it up. There have been some questions as to the indigenous and exotic bones in these caves. When once materials are entrusted to ocean currents, it is impossible to tell where they will go to; it is equally impossible to say from whence the exotic bones came that are buried in oolitic formations of ocean's deposit. We have shown that as water covered the sites of these bone caves at the time of their formation, and for long after, neither exotic or indigenous animal could have lived on the spot. As both sets of bones must have been carried to it, one set might have come from a different locality to the other. Tropical productions still find a water carriage to the arctic seas. There is therefore no difficulty in allowing that tropical bones might have been brought by ocean currents to build up our sign-posts; but, as there are regions on the earth where creatures of supposed different latitudes still live in harmony, it is by no means impossible that the owners of these old bones lived together, that they were subjected to the same repletions, the same deaths from that cause on the open plains, the same famines, and the same deaths in the river beds, with the same washing away of their remains. We throw aside the present teachings of precise æras and certain habitations: we discover in the harmony of the grave, an old harmony of life; we spread our time for elephant, rhinoceros, and cave hyæna over a greater period than the Pleistocene group, and we build our caves where there was material to build them of. We recognise in our buried strata the remains of a higher earth, where England now is, and we see these old lands connected by an animal highway, with Alpine and Pyrenean slopes. We read the inscription on old ocean's sign-post, as a guide to a great animal world, that has passed away on the wings of time, wiping out the "remembrance of former things."

We satisfy the old saying here—"Out of sight, out of mind." These old lands are fallen down, as our cliffs are falling to-day; that which is on the top goes to the bottom now, and that which was on the top went to the bottom then. No sooner did the waters retire from the level of these cave limestone hills than nature began to denude them. Rain fell on them and softened them, percolating through the inner masses; sunshine and frost cracked them, and the denudation alluded to in Nos. 7 and 8 commenced. Amongst the mountains of the Syadri range in Western India, we fell in with a very curious example of cave denudation.* The Ghara (white) River has cut its way through some 700 vertical feet of limestone rock of a coarse oolitic construction. A few miles from the town of Ghara the river becomes subterranean; a platform of limestone spans the stream at an elevation of some 2000 feet above the sea. This limestone is similar to that of the hills on either side of the valley. The channel which the river has formed for itself is a vast cave; and as the river had a clear course over its surface, it must have found some soft matter down below, through which it made an easy passage, leaving its bed open above, and returning to it still in heavy floods. There is no record of the substance that was contained in this cave; but all down the valley, on the surface soil, are still found calcareous nodules and fragments that must once have been parts of stalactite matter. If surface waters thus find out the soft places in the bosom of a great mountain range, there can be little doubt but that rainfall percolations do the same now, and have done the same in all time. As surface waters alter their course, so may subterranean waters; caves may have been left dry by these denuding streams; animals may have found entrance, and may have left on the still gelatinous bones the marks of their teeth. It may be asked here why these denuding streams should not have formed caverns, and conveyed into them the bones now found? There is no doubt that both these actions have occurred,* but the conditions of deposits and cave are not similar to the original bone-cave; the laminated rock shows fissures, materials of all ages are mixed up together, the state of preservation is not the same, stalactite and stalagmite coverings are not always provided, the inclines are often sudden, and the sides of the cavern tell of erosion. As we have said before, we are not writing on denudation, but showing how certain bone caves are made.

Man has tried to measure eternity by measuring the denudation of this earth: as its composition varies,

* See note, p. 97.

* See note, p. 97.

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as the denuding forces vary, such a measurement is impossible. In these caves we find bones of creatures that lived beyond record; man's remains have been found in them. We have a record of his origin, without date; if this is forgotten we may be excused for ignorance of the other: all we do know is that creatures lived and died; we shall never know when one race became extinct, or when another began. Can we be content to know that each race had a time, and a long time? We know these facts by the sign-posts above our heads and below our feet. There is no escape from the conclusions that water placed them where we find them, and that time has partly obliterated their tombs. There is a curious phase in this obliteration that ought not to be omitted, because it is so little understood. Most of us have seen sand and gravel resting in hollows, on the tops of boulders, over which water occasionally flows; the boulders are worn away by this gravel and sand, leaving their chaotic tails behind them, without any evidence of what they belonged to. We have seen these denudations going on over large areas, and we have no doubt that the absence of causes of non-stratification has helped man to add his obliterations to those of nature.

Looking through these well-known and plentiful defacements, we have considered bone-caves as grand sign-posts to past time, as proofs that there was once a land teeming with animals, as it now teems with man; that the animals were as liable to epidemics and castastrophes as man is liable now, and as the old vegetable world was before him. We are reaping the benefit of those vegetable deposits and formations. We know that we are leaving great deposits behind us, some of which will form future caves, and we cannot help seeing that between these deposits the great animal kingdom must have given over some of its relics to the ocean. Ocean gathered from every stream that sought his bosom such contributions as they brought; with his never-failing currents, and his perpetual tides, he placed in quiet places the remains of many animals,* covering them over with winding-sheets of home-spun material—his patent pyramids—leaving them as sign-posts along his track, that those who truly sought the path to a comprehension of those immutable laws given by the Eternal Legislator, should, step by step, perceive it, and comprehend how He gave life, death, and burial; teaching us every hour of our lives that "The thing that hath been, it is that which shall be."

We have not entered into the great field of skeleton, or of ichthyolite preservation; we have kept ourselves strictly to the formations containing bone-caves; we have only touched on their denudations so far as to make our tale intelligible, and we have endeavoured to plane away the marks left by the bad shots of man. There is nothing theoretical, wonderful, or exciting in our path: we believe it to be the path of Nature. We insist on nothing but the great truth of our text; and we conclude with a question, which we hope may not be lightly answered:—Is the bone-cave a record of a wild beast's dinner, or is the bone-cave a record, left by the waters, of a world that has passed away?

H. P. MALET.

* See note, p. 97.

STATISTICS OF ROMAN CATHOLICISM IN GREAT BRITAIN.

AMONGST the facts bearing upon the population of a country, those referring to religious belief are of great importance and interest, especially if there are forms of belief, the adherents of which endeavour to influence public policy. Differences of religion have led to the most atrocious persecution and most sanguinary wars during the middle ages, and even our own times, though far more tolerant, are not free from contention traceable to religious opinion. To prove this we need only refer to the difficulties connected with the government of Ireland, to the conflict now raging in Germany, or to the minor troubles which Russia has to encounter in the reluctance of the Mennonites to submit to the law on military service.

In Great Britain no religious census has been taken for many years past, but the registration of marriages fortunately affords a ready means of arriving at the approximate number of adherents to each creed. In the case of Roman Catholics, who look upon marriage as a sacrament, the number of marriages may be depended upon as giving a result closely approaching the truth, unless, indeed, we assume that the marriage rate amongst them differs considerably from that amongst the rest of the population.

NUMBER OF CATHOLICS IN ENGLAND AND WALES.—There is not the least doubt that the number of Roman Catholics in this country has increased at a considerable rate for many years past, and it will be our business, not only to inquire into the extent of this increase, but likewise into the causes which have led to it. In the reign of Queen Elizabeth, the Roman Catholics, according to Hallam, constituted above one-third of the population, but in 1699 they had dwindled down to 27,696, being 0·54 per cent. of the total population. These were the times of penal laws; but in spite of them, when a second enumeration was made, in 1769, it was found that the Roman Catholics numbered 67,917, or 0·97 per cent. Subsequently to that year, the penal laws, though still retained on the statute book, were not enforced rigorously, and in 1778 the first Act ameliorating the position of the Catholics was passed. Yet, in spite of this, they numbered only 69,380 souls, or 0·89 per cent. of the population in 1780; and from that time down to the beginning of the present century their number remained stationary, or, perhaps, even decreased. It was only in consequence of a large influx of Irish immigrants that they began to increase. In 1844 they still constituted only 1·07 per cent. of the population, but after that time years of famine drove the Irish in ever increasing numbers from their native country. The Catholic population of England kept increasing with the stream of Irish immigrants which overflowed her shores, and in 1863 there were 5·09 Catholics to every hundred inhabitants. But the maximum had been reached, and since that year there has been a steady decrease, until, in 1871, the Catholic population found itself reduced to 4·02 per cent.

NUMBER OF CATHOLICS IN SCOTLAND.—In Scotland where the indigenous Catholic population has always been much larger than in England, especially in some districts of the Western Highlands, and on the islands, the Irish immigrants contributed to its increase in the

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same manner as in England. McCulloch estimates the Roman Catholic population of Scotland in 1839 at 140,000, which would have been about 5½ per cent. of the population. In 1855, the first year for which there is a return of marriages, the Roman Catholics constituted 9·28 per cent. of the population; in 1865 they had increased to 10·16 per cent., but since that time they are steadily decreasing, numbering no more than 8·89 per cent. in 1870.

SUMMARY FOR GREAT BRITAIN.—The number of Catholics in Great Britain at different periods, and their percentage of the population, is shown in the following tabular statement:—

Year.	England and Wales.	Scotland.	Per centage of population. England and Wales.	Scotland.
1780	69,380	—	0.89	—
1845	328,000	—	1.96	—
1851	766,000	—	4.26	—
1855	909,400	277,300	4.83	9.28
1861	955,600	265,500	4.75	8.65
1865	998,000	323,600	4.72	10.16
1871	915,800	277,200	4.02	8.23*

Catholics in Great Britain, 1871, 1,193,000, or 4.56 per cent. of population.

INCREASE OR DECREASE.—The proselytism supposed to be carried on by Roman Catholic priests, and particularly by Jesuits, has disquieted many a staunch Protestant, and the most exaggerated notions have been formed respecting it. There is no doubt that the Roman Catholic Church now and then gains over to its fold members of other congregations, and that amongst these converts there have been several whose clerical garb or social position attracted more attention than would have been the case had they been of more humble antecedents. But converts are made now and then by every church possessed of vitality, and whilst the convert to Roman Catholicism is received with a certain amount of *éclat*, those who secede from it, whether they join another church or merely content themselves with the religious principles enunciated in Strauss's *Old Faith and the New*, pass unnoticed. We have already shown that the Roman Catholic population of Great Britain is decreasing, and that at a rate which ought to alarm the friends of the only true faith. This decrease is undoubtedly taking place, and it only remains for us to ascertain whether it is due to an exodus of our Irish population, or to secessions from the Roman Catholic Church.

The Roman Catholic population of England and Wales consists of three constituent elements. There are the descendants of the old English Catholics (who are most numerous in Lancashire, Yorkshire, Staffordshire, Warwickshire, Northumberland, and Durham), the foreign Catholics and their descendants, and the Irish Catholics and their descendants. To these some would add recent converts as constituting a fourth class.

In 1780 the Catholics residing in England and Wales were found to number 69,380 souls. If these increased at the same rate as the rest of the population (203 per cent. in ninety-one years), their descendants, in 1871, would number 140,840.

Amongst the foreigners residing in England and Wales in 1871, judging by their place of birth, there were probably 42,000 Roman Catholics. If we add to this number 31 per cent. for children born in England, we obtain 55,620 as the total of foreign Roman Catholics, exclusive of course of their more remote descendants.*

The natives of Ireland residing in England and Wales in 1871 numbered 566,540. Assume that 77 per cent. of these were Roman Catholics, as is actually the case in Ireland, and we have 436,236 Catholics born in Ireland, of whom 384,000 were twenty years of age or older, and 52,200, or 11·97, less than twenty years of age. Amongst the total population the proportion of inhabitants less than twenty years of age is 45·71 per cent. Assume the same proportion to exist in the case of these Irishmen (and from the proportion of the sexes there is no reasonable ground for doubting that such is the case), and we have 583,300 Roman Catholics born in Ireland and their children born in England. Add these three items and we have—

Descendants of the old English Catholics ...	210,000
Catholics born abroad and their children	55,600
Catholics born in Ireland and their children..	583,300
Total	848,900

But as the Roman Catholic population of England and Wales amounted in 1871 to 915,800 souls, there still remains 66,900 to be accounted for.

It cannot have escaped the notice of our readers that we have included above only the children of foreigners and of natives of Ireland, and not their more remote descendants. The census returns afford some means of arriving at the numbers of these. In 1841 there lived in England and Wales 289,404 natives of Ireland; who, with their children born in England, would number about 387,000 souls, of whom 77 per cent., or about 298,000, were Catholics. If these 298,000 increased at the same rate as the rest of the population (43 per cent.) they, and their descendants, ought to have numbered 425,000 souls in 1871. But of these 425,000 souls only about 170,000 would be survivors† of the original 298,000 alive in 1841, and of these 170,000, only 97,700, would appear in the census returns for 1871 as "born in Ireland," whilst the residue of 72,300 would represent the surviving children. Deducting 170,000 from 425,000 we have 255,000 as representing the children born by natives of Ireland residing in England in 1841 after that year, and for their children's children and more remote descendants. This number more than balances the 66,900 not accounted for above, and relieves us altogether from the necessity of further pursuing this subject. Making every allowance for errors of calculation, due to the imperfect materials at our command, there is no doubt that, looking merely to the natural increase of the population, the Roman Catholics of England and Wales ought to be much more numerous than they actually are. The fact of their being stationary, or rather retrograding, can be explained only in two ways, either by an exodus of our Irish population far exceeding that of the general population, or by numerous secessions from the Roman Catholic Church.

* Estimated. In 1869 there were 9.23, in 1870, 8.89 per cent.

* In 1580 there resided in London 4960 foreigners, who had 1542 children born in England, being 31 per cent. of their own number.

† Our calculation is based on the table showing the probability of living ten years, as given in vol. iv. of the Census Returns for 1871, and in which account has been taken of emigration.

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Has there been such an exodus? In 1861 there lived in England and Wales 601,634 natives of Ireland, of whom 475,290 would survive until 1871, to be returned for a second time as "born in Ireland."* The number of natives of Ireland enumerated in 1871 was 566,540. There cannot therefore have been any excess of emigration. On the contrary, assuming that none of the Irish living in England in 1861 left the country, there must have been at least 91,250 fresh arrivals to account for the natives of Ireland actually enumerated in 1871. We cannot therefore speak of an exodus of our Irish population, merely because the natives of Ireland enumerated in 1871 were less than those enumerated in 1861. Irish immigration certainly has received a check, but is still going on on a reduced scale.

There remains, therefore, only the other alternative, namely, that the secessions from the Roman Church are exceedingly numerous. And if we look to what is passing in other countries, the bulk of the population of which is Protestant; if we consider the consequences of the intolerant restrictions of mixed marriages, which require that *all* children should be brought up in the Catholic faith; to the religious indifference of our age and other causes, no surprise need be felt that such is the fact.

We have not the least hesitation, therefore, in asserting:—(1.) That the large immigration of Irish Roman Catholics into England and Wales satisfactorily accounts for the increase of Roman Catholics since the beginning of this century. (2.) That the decrease in the number of Roman Catholics observed during the last few years is due to secessions from the Catholic Church rather than to the emigration of its members.

DISTRIBUTION OF ROMAN CATHOLICS.—Our map and the table appended to this paper sufficiently illustrate the distribution of Roman Catholics and of Roman Catholic institutions throughout Great Britain. In England and Wales there are only two counties (Radnor and Merioneth) which are without a Catholic place of worship, though there are many where the number of Catholics is exceedingly small. Out of the total of 915,300, no less than 330,000 (or 36 per cent.) live in Lancashire. In Scotland a similar pre-eminence is held by Lanarkshire with its 130,000 Catholics (being 47 per cent. of all Scottish Catholics). As might be supposed from the general distribution of the Irish element, the Catholics number most largely in some of our big towns. In London there are about 131,000, or 4·02 per cent. of the population; in Manchester and Salford, 250,000; in Liverpool, about 72,000, &c.

CATHOLIC PLACES OF WORSHIP.—The increase of Roman Catholic places of worship did not keep pace, during the first year of the great influx of Irishmen, with the increase in the number of Roman Catholics. In 1844 there were in England and Wales 506 Catholic places of worship, according to the *Catholic Directory;* in 1851, 583; in 1853, 616; in 1865, 941; in 1869, 1122; and in 1874, 1025.† If we compute the number of Roman Catholics for each of these years, we find that there were to each place of worship 350, 1200, 1490, 1060, 720, and 634 respectively. In spite, therefore, of the increase in the number of places of worship, the accommodation provided for Roman Catholics is not as bountiful in 1874 as it was twenty years ago, and the increase in the number of chapels need not therefore cause anxiety to the opponents of Roman Catholicism, especially if they consider that the places of worship provided for the use of Protestant bodies are comparatively more numerous.

The above statement respecting the places of worship has been taken from the summary given annually in the *Catholic Directory*. We have taken the trouble of casting up the chapels, &c., mentioned in the Directory, and our results do not differ materially from the above. We have included under "Churches and Chapels," only those places of worship to which a priest is permanently appointed; under "Stations," all those chapels, rooms, &c., which are visited by a priest only occasionally. Many of these are nevertheless registered for the celebration of marriage. Chapels supported at the public expense, as are those in barracks, prisons, workhouses, &c., as well as convents have been excluded. We arrive thus at the following results for the years 1865, 1869, and 1874:—

	1865.		1869.		1874.	
	Churches.	Stations.	Churches.	Stations.	Churches.	Stations.
England and Wales.....	717	133	822	130	843	187
Scotland.....	122	55	120	72	135	87
Isle of Man..	6	...	6	...	8	...
Channel Islands	2	2	2	2	2	2
Total ...	846	190	950	204	988	276

The details for the year 1874 will be found in the tabular statement at the end of this paper.

PRIESTS.—The increase in the number of priests kept pace pretty well with the increase in the number of places of worship. The latter, between 1865 and 1874, increased to the extent of 22 per cent., the priests to the extent of 24 per cent. In the former year there were in Great Britain 1521 priests; in 1874, 1893. The increase amongst the regular priests (or monks) has, however, been greater than that amongst the ~~regular~~ clergy. The details for the two years named are given in the following tabular statement.—

		Bishops.	Secular Priests.	Regular Priests.	Total.
1865	England and Wales...	17	902	410	1329
	Scotland	4	58	21	83
	Isle of Man	...	3	...	3
	Channel Islands	...	6	...	6
	Total.....	21	969	431	1421
1874	England and Wales...	17	1000	634	1651
	Scotland	3	187	41	231
	Isle of Man	...	3	...	3
	Channel Islands	...	8	...	8
	Total.....	20	1198	675	1893

These figures show that there is now in England and Wales one Roman Catholic priest to every 580 Roman Catholics, which is a high proportion if we consider that there was only one clergyman, minister, priest, or missionary to every 673 inhabitants enumerated in 1871, but exceedingly moderate in comparison with some intensely Roman Catholic countries, such as Italy, where (in 1861) there was one priest to every

* The mean age of the population of England and Wales is 26·4 years. We have assumed the mean age of the natives of Ireland to be 36 years, an assumption justified by a careful consideration of the census returns.

† This decrease is merely apparent, and results from a different system pursued in counting places of worship.

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Map of Great Britain
shewing the Distribution of
ROMAN CATHOLICS,
—— and of ——
R. Cath. Chapels, Convents & Monasteries.

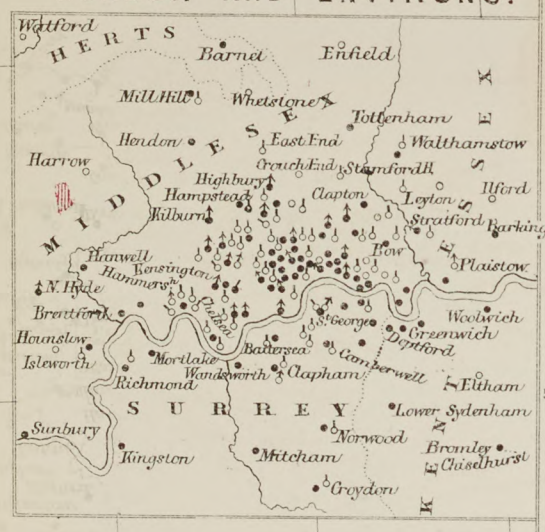
By E. G. Ravenstein, F. S. S.

- Roman Catholic Church or Chapel.
- Roman Catholic Chapel or Station attended only occasionally.
- Monastery. ♁ Convent.
- Town having one or more R. Cath. Chapels, Monasteries and Convents.

---------- Boundaries of the Roman Catholic Dioceses of Great Britain.
..... County Boundaries.

The tint expresses the proportion of Roman Catholics to the general population in 1871 (England & Wales) or 1870 (Scotland), viz:
The Roman Catholics constitute 10 or more per cent of the total population.
..do.... from 5 to 10 per cent.
In the districts not tinted they number less than 5%.

LONDON AND ENVIRONS.



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194 inhabitants. It should be observed, however, that this favourable proportion between the priests and their flocks has existed only within the last few years, and is due in no small measure to the cessation in the increase of the number of Catholics; and that in 1853, for instance, there was only one priest to every 1071 Catholics.

MONASTERIES AND CONVENTS.—If there is any subject connected with Roman Catholicism which arouses the ire of No-Popery men, it is the ever-increasing number of religious houses; and it affords but small comfort to them if they learn that most of the monks (or regular priests) are engaged in the conduct of public worship, whilst the sisters find employment in schools or charitable institutions. The number of religious houses has increased steadily ever since 1829, when there existed only 6 convents, and in 1841 there were 17 religious houses; in 1865, 245; in 1874, 329, in addition to 27 in Scotland. The details for the years 1865 and 1874 (as given in the *Catholic Directory*) are as follows:—

	England and Wales.			Scotland.		
	1865.	1869.	1874.	1865.	1869.	1874.
Monasteries	58	68	85	5	6	6
Monks (regular priests)	373	432	634	20	33	41
Convents	187	214	244	14	18	21

It appears that there is now in England and Wales one monk to every 1490 Roman Catholics.

With reference to the number of nuns we possess no data furnished by Catholic authorities, but we learn from the census returns that there were in 1871, 2474 "nuns, sisters of charity, of mercy, &c.," 152 of whom were under 20 years of age. This number, however, probably includes Protestant sisterhoods, and it is to be regretted that no distinction was made between the two classes.*

The distribution of the monasteries and convents throughout Great Britain may be gathered from the tabular statement appended to this paper. The 675 regular priests of Great Britain belong to 27 different religious orders. The Jesuits have 12 monasteries, the Fathers of Charity and the Benedictines 8 each, the oblates of St. Mary immaculate and Capuchins 7 each, and the Dominicans 5. The nuns belong to no less than 63 religious orders, the names of many of which are indicative of their foreign origin. There are 41 convents of Sisters of Mercy, 34 of Sisters of Charity of St. Paul, 17 of School-sisters of Notre Dame, 14 of Sisters of Charity of St. Vincent of Paul, 12 of Faithful Companions of Jesus, 11 of Little Sisters of the Poor, 8 each of sisters of the order of the Good Shepherd and the Congregation of Mary, 7 each of Benedictines, Sisters of the Holy Family, and Sisters of the Holy Child Jesus, &c.

* It is, indeed, very desirable that more care should be bestowed upon the *moral* training and education of our Catholic population; and now that the Roman Catholics have a sufficient supply of chapels, it is to be hoped they may do something towards the establishment of schools, conducted by properly qualified schoolmasters and mistresses, and not by monks and nuns. Amongst the prison population of England and Wales, no less than 18 per cent. are Catholics, the Catholic population numbering hardly more than 4 per cent. of the general population. In other words, the chances of a Catholic committing a crime are more than four times greater than in the case of a Protestant. This, certainly, is a glaring instance of the influence of education upon crime; but if the Rev. M. H. Seymour, in his "Evenings with Romanists," traces illegitimate births and murders to the doctrines promulgated from Rome, he certainly shoots beyond the mark. The statistics of illegitimate births show very clearly that their number is altogether independent of religious belief, and is influenced mainly by bad laws and social circumstances. Remarkable instances of this are Mecklenburg and Bavaria, where the rate of illegitimate births fell immediately certain Malthusian restrictions to marriage were removed. Or does the rev. gentleman referred to mean to maintain that London is more moral than the country, because its illegitimate births are fewer? Might we not almost be justified in coming to an opposite conclusion?

TABULAR STATEMENT showing the proportion of Roman Catholics in the counties of England and Wales (1871), and Scotland (1870), and the number of Roman Catholic Chapels, Stations, Monasteries, and Convents according to the Roman Catholic Directory for 1874.

The Counties are arranged according to the prevalence of Roman Catholics.

Roman Catholic Chapels supported from public funds (in Barracks, Workhouses, &c.) have been omitted.

COUNTIES.	Roman Catholics in per cent. of Population.	Churches.	Stations.	Monasteries.	Convents.
Lancashire	11.6	185	16	16	45
Durham	8.5	41	6	...	8
Cumberland	7.3	10	1	...	2
Northumberland	5.9	29	3	1	4
Cheshire	5.6	30	5	2	4
Monmouth	4.4	13	9	2	...
Glamorgan	4.4	9	8	3	4
Warwick	3.9	33	3	2	14
York, West Riding	3.8	48	17	3	14
Brecknock	3.5	1	1	...	...
Middlesex	3.5	65	9	24	45
Staffordshire	3.4	41	5	1	9
York, East Riding	3.1	12	2	2	4
Derbyshire	2.6	11	5	...	3
Surrrey	2.6	23	1	5	12
York, North Riding	2.1	20	10	1	2
Flint	2.1	7	...	2	2
Kent	1.9	21	12	4	3
Westmoreland	1.9	2	1	..	1
Denbigh	1.7	2	2	...	...
Leicester	1.4	13	7	5	1
Gloucester	1.4	16	5	1	10
Hampshire	1.3	18	3	1	2
Hereford	1.3	7	...	1	2
Essex	1.2	4	5	...	1
Nottingham	1.1	5	2	...	2
Oxford	1.1	9	...	...	2
Worcester	0.9	15	1	1	4
Devon	0.8	12	2	...	7
Lincoln	0.8	13	2	...	...
Pembroke	0.8	2	1	...	...
Sussex	0.7	17	6	3	9
Shropshire	0.7	10	5	...	1
Dorset	0.6	9	...	...	3
Wilts	0.6	7	1	...	3
Berks	0.5	9	3	1	2
Norfolk	0.5	7	1	...	2
Cambridge	0.4	4	4	...	...
Suffolk	0.4	7	5	1	2
Carnarvon	0.4	3	...	...	...
Anglesey	0.4	1	...	...	...
Herts	0.3	20	5	2	8
Somerset	0.3	12	3	1	3
Bucks	0.2	5	1	...	2
Cornwall	0.2	5	4	...	1
Northampton	0.1	3	3	..	*
Carmarthen	0.1	2	...	...	...
Bedford	...	2	1	...	...
Huntingdon	...	1	1	...	...
Rutland	...	1	...	...	...
Cardigan	...	1	...	...	...
Montgomery	...	1	...	...	...
England & Wales	**4.02**	**843**	**187**	**85**	**244**

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TABULAR STATEMENT.—*Continued.*

COUNTIES.	Roman Catholics in per cent. of Population.	Churches.	Stations.	Monasteries.	Convents.
Renfrew	17.2	10	1	...	...
Lanark	16.5	25	9	4	7
Dumbarton	15.6	4	1	...	...
Linlithgow	12.6	4	3	...	...
Inverness	12.0	17	11	...	1
Forfar	8.5	5	3	...	2
Haddington	7.7	1	2	...	...
Stirling	6.9	6	4	...	...
Edinburgh	6.1	5	2	1	4
Nairn	5.1	1	...	...	...
Roxburgh	4.7	2	3	...	...
Ayr	4.5	10	5	...	...
Bute	4.4	1	...	...	...
Dumfries	2.8	1	2	...	...
Elgin	2.5	2	...	...	1
Banff	2.5	10	1	...	1
Argyle	2.5	5	6	...	...
Peebles	2.5	1	1	...	...
Wigton	2.1	2	3	...	...
Selkirk	2.1	1	2	...	...
Perth	2.0	4	7	1	1
Aberdeen	1.9	9	5	...	3
Kircudbright	1.8	3	4	...	...
Fife	0.9	3	5	...	...
Clackmannan	0.7	1	...	...	...
Berwick	0.5	...	2	...	...
Ross and Cromarty	0.3	1	1	...	1
Kincardine	...	...	1	...	...
Caithness	...	1	1	...	...
Orkney and Shetland	...	...	2	...	...
Scotland	**8.89**	**135**	**87**	**6**	**21**
Great Britain	**4.56**	**978**	**274**	**91**	**265**
Isle of Man	...	2	2	...	1
Channel Islands	...	8	...	1	2

E. G. RAVENSTEIN, F.S.S.

SINGAPORE.*

WHO, on visiting the capital of that important dependency of the British Crown, "The Straits Settlements," Singapore (the position of which in regard to the entrance of the China Sea caused it to be regarded as the key, if not now so considered), would not ponder and note within himself the caution and consideration that must have been exercised, and the prudence and wisdom that dictated the selection of such a spot for a settlement, commanding, as it does, the very elbow of the Strait of Malacca, and obliging every vessel entering or leaving the China Sea by that route, to pass within sinking distance of the forts of the harbour? After all this consideration and mental approval of the evident cause of the position being selected, would not the visitor be surprised to learn that the selection of Singapore as a British station was one far more the result of accident than of selection, and that the expedition that founded the settlement had actually sailed for another destination? Still such is the fact, although not generally known, and Singapore with exports and imports now valued at from fifteen millions to twenty millions, and a population exceeding 100,000, was a little over half-a-century ago a place comparatively unknown.

* The substance of the following account of our taking possession of Singapore Island was kindly furnished to the writer by Archibald Ritchie, Esq., who was present on the occasion.

But let us take a bird's-eye view of Singapore as it is, and for which purpose let us toil to the summit of Serapong, from which elevation we shall obtain all we can desire. Serapong is termed *par excellence* "Mount," although rising but 300 feet above the sea. It is but a mole hill to talk of toiling up it!—but stop—on or near the equator—

"Where the sun no lengthened shadow throws,"

a temperature of 96° in the shade and not a breath of wind, we may well be pardoned our expression of "toiling up it,"—and oh the luxury of reaching the top! saturated with perspiration and feeling the cool breeze which, from being on the leeward side, we had not before felt. What a glorious sight bursts on us! We are on the highest point of Blakan Mati Island, the western end of which, together with Ayerbrani Island, lying immediately beneath us, forms the New Harbour, the north shore of which is now lined with docks, wharves, and storehouses, and all the busy work going on of a thriving and prosperous sea-port. Alongside the wharf of Tibing Tingi, lies one of the floating palaces of the Peninsular and Oriental Steam Company, taking in the nourishment of fuel, of which they consume so much; and, forming a background, the hills rise and shut out further view of the country in that direction.

Round that long sandspit, lengthened out, as it were, by numerous lines of fishing stakes, lies the town of Singapore, with the many-winding river dividing it. How clear and distinct it is, notwithstanding the haze that hovers over it, caused by the extreme heat, and we see at once the advantage of those villa-topped hills, rising as they do above the hazy line. We do not wonder at those eligible localities being seized on for the erection of cool bungalows to retire to after the heat of such a day as this: in the town every foot above the sea level has its value. We can clearly see the church and its neighbouring esplanade, dear to the European for the cool drive round in the evening, and, just beyond, the Institution, which is named after that truly great man, of whom we shall have to mention, Sir Stamford Raffles; and again, beyond this, the native town, which covers a large extent of ground. All seems quiet and lovely at Singapore, too far distant for the disagreeables to intrude, and yet not too far for a minute survey; it may be described as just that, where "distance lends enchantment to the view." And then to turn from the works of man, and let the eye wander over the range of country visible from our vantage-point, how truly lovely it appears; the deep jungle, stretching ridge beyond ridge, until it meets the high mountains rising behind it in the distance. But how treacherous is that beautiful country—death lurks in the miasma rising from the jungle, and the too frequent visits of the *man-eater* do not tempt one to explore far within its depths.

We must not forget the *Roads*, in which lies many a gallant merchant ship, from all maritime nations under the sun. How varied are their rig! Some are taking in cargo, and we can almost fancy, as we look through our telescope, that we can hear the shrill whistle of the Serang, and the clapping of the hands of one-half of his gang as they hoist in the bags of rice or spice; while stealing over the calm water is the prah of the Malay, the Chinaman in his sampan, and the English captain of the man-of-war in his six-oared gig: such is Singapore of the present.

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At Fort Gloster, a manufacturing and ship-building establishment on the Hoogly, about 23 miles below Calcutta, resided, in the year 1818, a gentleman, still alive, and then in charge of the station: this gentleman, Mr. Ritchie, received intelligence that one of the ships (the 'Rodney') belonging to the firm he represented, was *on shore* about 36 miles down the river, and that she had on board, as passengers, Sir Stamford Raffles and family. He immediately despatched a boat to their relief, and after extending the rites of hospitality to the party, who had been somewhat alarmed at the position they had been placed in, forwarded them the next day to their destination, Calcutta.

Sir Stamford Raffles had just resigned his charge, as temporary Governor of the island of Java, to the Dutch, in accordance with the intention of the British Government, who had only assumed the possession to prevent that important island falling into the hands of the French, and was then on his way to visit the Governor-General of India, General Earl Moira (afterwards Marquis of Hastings).

The object of Sir Stamford's visit to Calcutta was to take counsel with the Governor-General in regard to obtaining possession of some station in the Malacca Strait, for the protection of our great trade to the East Indies, and Sir Stamford's intimate knowledge of the tangled dynastic position of the numerous petty Malayan rajahs and of their language—and for which knowledge he had been selected, when Mr. Secretary Raffles of Penang, by Lord Minto, to accompany him, when about to take Java under British protection, and then leave him Governor of the island—rendered him peculiarly competent to undertake the establishment of a colony, for the purpose stated.

Having completed the object of his visit, and armed with the necessary powers from the Governor-General, Sir Stamford proceeded to Penang, there to collect troops and organize his expedition.

At this time Mr. Ritchie was sent as supercargo in a fine ship the 'Marchioness of Wellesley,' of 900 tons, to Penang, and arrived there when preparations for the expedition were being made, and as the 'Marchioness of Wellesley' was adapted for the conveyance of troops, Mr. Ritchie was induced by Sir Stamford to discharge his cargo for the purpose of accompanying the expedition.

About a week after the expedition sailed; its destination being the Nicobar Islands, which, lying immediately across the western entrance of Malacca Strait, was considered a good position for commanding the strait; but the nature of those islands was then imperfectly known, for although a survey had been some time in progress under Captains Ross and Crawford, of the Indian Navy, the result of that survey had not been published or made known; but those officers having heard of the object and destination of Sir Stamford's expedition, and not having time to reach Penang before it sailed, waylaid it, and in time to alter its destination.

The surveyors had an interview with Sir Stamford and Colonel Farquhar, who commanded the troops, and producing their charts, pointed out the deficiencies of the Nicobar Islands in harbours, or places of shelter, for shipping, and the superior advantages of Singapore Island, which they had lately surveyed, and that, in addition to the superiority of geographical position, the island was rich and fertile, and the roads and harbour commodious and well adapted for all purposes connected with shipping.

Another accidental advantage lay in the absence of any native government, the Rajah having, only a few months previously, been obliged to fly his dominions from his dynastic enemies, and most of his subjects had followed him, so that at the time there were not more than 150 Malay inhabitants on the island.

The soundness of the views thus laid before Sir Stamford were unanswerable, and a council of war being summoned, the subject was discussed, and the result was an order to alter the course of the expedition for Singapore, where they arrived on the 23rd February, 1819.

It is needless to say that Sir Stamford Raffles found Captains Ross and Crawford's report correct in every particular, and the British flag was hoisted where the extensive town of Singapore now stands.

BRITISH COLONIAL WOOL TRADE.

NEARLY 800,000 bales of British Colonial wool, of the value of 15,000,000*l.*, are annually sold in London, but so accustomed are Englishmen to large mercantile transactions that but very few, on reading these figures, would probably stop to inquire how this trade has come to assume such immense proportions, and from whence all the wool comes.

Our object in this short paper will be to supply that information. In 1815 the Colonial Wool Trade did not exist, and England was obliged to go to France and Germany for wools. At the present time the tables have been quite reversed, and France and Germany are large purchasers in our market, whilst the importation of their wool for our use has nearly ceased.

It has been said that the value of the wool produced in our colonies and sold annually in London is 15,000,000*l.*

The following table of the exports of the principal wool-producing colonies in 1871 accounts for over fourteen millions in that year:—

	Quantity of Wool exported.	Value.
	lbs.	£
New South Wales . .	48,748,092	2,858,360
Tasmania	5,254,719	298,160
Victoria	76,334,480	4,702,164
New Zealand . . .	37,793,734	1,606,144
Queensland	22,339,343	1,158,833
South Australia . .	28,539,567	1,170,885
Natal	5,763,999	172,806
Cape	46,279,639	2,191,233
	271,053,578	£14,158,585

Victoria and South Australia have been founded thirty-eight years, Queensland only fifteen years, and the Cape of Good Hope commenced its first export of wool fifty-four years ago, namely in 1820.

The bulk of this trade has therefore but recently come into existence.

The outlying districts of nearly all the Australasian Colonies and New Zealand were, in the first year of settlement, very early taken up as sheep and cattle runs. The native grasses, which grow in great luxuriance, are admirably adapted to the sustenance of sheep. Lands which are now covered with thriving

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townships, and surrounded with cultivated farms were only a few years ago unpeopled sheep runs. Pastoral leases are now granted to sheep farmers of immense extent of territory in some instances, at a very moderate rental, and an assessment according to the number of sheep or cattle they are estimated to carry. These leases are generally granted for fourteen or twenty-one years, with distinct conditions, amongst others, that when the runs are required for agricultural purposes, the Government can resume them on giving six months' notice, and compensating the lessors for real improvements effected during their tenure of the land.

New South Wales was the first colony which imported Saxon sheep, and this Merino breed was introduced into other parts of the continent and New Zealand from the parent colony.

In Queensland, Tasmania, and the other colonies of the Australian group, the original Merino blood thus introduced has been preserved and improved by the systematic introduction of German rams.

In the last few years, however, there has been a large importation into all these colonies of Leicester and Lincoln sheep. In many cases these heavy wool-bearing sheep yield satisfactory results; but there can be no doubt that this great increase of cross-bred flocks will, sooner or later, depreciate the value of the shorter but finer Merino wool. The cross-bred wool is generally irregular, and the staple not very compact, whereas the staple of the Merino is of good length, stout grown, and sound.

In no country has the production of wool increased to so great an extent as in Australia—the actual increase within the last ten years has been more than 130 per cent.

With regard to the Cape of Good Hope, it is an interesting fact that it possesses a native sheep, which is however *not* a wool-bearing animal, but that immense flocks of these creatures have, by the introduction of numbers of fine Burgundy rams, been converted into wool-bearing sheep.

In 1820 the value of wool sent from the Cape was 690*l.* In 1872 the value was 3,275,150*l.*

It was not until 1827 that the value of sheep-farming began to be thoroughly appreciated at the Cape, and it was not until some years later that any large and regular annual importation of foreign rams was commenced, the result of which has been that most rapid progressive production which is shown in the preceding figures. The number of wool-bearing sheep at present in the Cape exceeds 8,000,000, and the number of native or fat-tailed sheep is only 1,500,000. In addition to the large export of wool from the Cape of Good Hope, there is an annually increasing export of Angora hair. Angora goats were introduced in 1856 from Asia Minor, and 876,860 lbs. of hair were exported in 1872, of the value of 58,800*l.*

It may not be generally known that the spinning of this hair into yarns is performed in Yorkshire. The finer sorts are exported to Lyons and used in the manufacture of lace. A great quantity goes also into Germany, and is used for dress goods. The coarsest kinds are made into stuffs, which eventually are converted into imitation fur and seal-skin for ladies cloaks.

The trade in Angora wool will ultimately be, without doubt, a very important one.

W. ROBINSON, F.R.G.S.

Reviews.

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GEOLOGICAL SURVEY OF INDIA.*

DURING the year 1873 the Geological Survey of India suffered from the enforced absenteeism and sickness of its members. But in spite of this, much valuable work has been done. Mr. King has examined the Beddadanole coal-field, and discovered, to the west of Rajamandri, some fossiliferous zones of marine beds which form an important link in the geological history of India. Under the guidance of Mr. Hughes, two pits have been sunk to the coal in the Wardha coal-field in the basin of the great Godavari River. Mr. Medlicott's, the officiating superintendent, examination of the Satpura coal-measures, was interrupted by having to superintend borings in the Narbada Valley, a class of work which should be apportioned to officers of the Public Works Department. In South Behar Mr. Mallet was engaged on the examination of the crystalline and metamorphic rocks; and, judging from the results, there appears to be no marked break between the quartzite and slate series of Behar and the gneiss of Bengal. A peculiarly close sequence of formations has been hit upon by Mr. Wynne in the ground to the north of the Salt Range, a feature which will be better understood when the long stretch of mountains between the Jhilum and Ravi have been explored. On the south-east of India, Mr. Theobald has completed the survey of Pegu, commenced in 1860. To the east of the Salwin, the country has not been surveyed topographically, and most perplexing difficulties were encountered by the geologist. The rank tropical vegetation, and the softness of the rocks, created a uniformly deep soil, which prevented Mr. Theobald, for days together, from getting a fair section of rock. Fossils appear to be very scarce throughout Pegu. The south-eastern districts of the province, a totally distinct geological field, are formed entirely of crystalline and sub-metamorphic rocks, and give so much promise of metalliferous deposits, that Mr. Fryar, a mining engineer, has been commissioned to examine them. Mr. Theobald's work next season is to examine the great Sivalik mammalian fauna in the North-West Provinces.

The recent meeting between the Maharajah of Sikkim and Sir G. Campbell, the late Governor of Bengal, and the attempts to penetrate by Sikkim into Tibet for trading purposes, have brought this little native principality of late more prominently into notice. A topographical survey of the state is much to be wished for, but the limited budget of the Survey Department would not permit of a party being organized for this. There is, however, reason to believe that serviceable coal deposits exist in Sikkim, and Mr. Mallet has accordingly been deputed to investigate this point during the ensuing season.

Mr. Medlicott, during such time as he can spare for field work, will examine the recently discovered coal-measures in the Garo Hills. They are probably situate within an interior basin, the existence of which was not suspected, owing to the deficiency of our knowledge of the country. Until the last five years,

* Annual Report of the Geological Survey of India, and of the Geological Museum, Calcutta, for the year 1873.

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these regions, about as distant from Calcutta as York is from London, were as little known as the remote parts of Central Asia, and this because of the savage propensities of our subjects there!

A competent metallurgist, Mr. Bauerman, has of late been visiting various parts of India, with the object of reporting on the practicability of iron manufacture in India of European methods. His investigations corroborate the conclusions arrived at by the Geological Survey and other authorities, that the Raniganj coal-field is the most promising place for a trial, and that the principal defect there is the flux, a deficiency which the Geological Survey by diligent search is doing its best to overcome.

An interesting, though it can scarcely be called a hopeful project has been set on foot by the Government of India in connection with geology. The disposition to open increased avenues of employment in the Civil Service to natives, has induced them to attach a few native students to parties in the field. These students have hitherto received little previous instruction except such as they could pick up from a text-book and by inspecting specimens in the museum. They may at the best be able to do such comparatively mechanical work as looking for outcrops of coal formations or for fossils. But for the important part of geological investigations, which requires a modernised mind, habituated to form inductive conclusions, a primitive mind and a temperament like that of the Indian native, to whom physical science is utterly distasteful, are most unsuited. For the ensuing season four of these apprentices (all from Lahore College) are appointed to accompany the field surveyors.

In the first number of last year's *Records* there is a sketch of the geology of the North-West Provinces, the only part of India which has been entirely, though more or less cursorily, visited. The second gives us a map and description of the Bisrampur coal-field, which will assume importance when the direct route between Bombay and Calcutta is established. An interesting statement of the coal-measures of different countries as compared with India, finds place in the third, as well as a description of the brine springs of Pegu, which are now being fast superseded by the manufacture of sea-salt and the import of foreign salt into British Burmah.

To avoid clashing with his deputation to Yarkand, the *Palæontologia Indica* were brought out by Dr. Stoliczka early in the year, and the results have fully sustained the previous credit of the work. A most important geological collection was, through the exertions of some of the officers, got together and placed in the Vienna Exhibition.

Dr. Oldham himself, the accomplished Superintendent, after twenty-two years of continuous service, has been compelled to take sick leave to Europe. Others in the same branch of the service have been more or less impeded by the ill-health which so continually besets them. It is impossible, in reading these records of the labours of the Geological Survey of India, to refrain from admiration of the untiring energy displayed by its members under circumstances of so harassing a character.

ON THE TEMPERATURE OF THE ATLANTIC.*

THE scientific voyage of Her Majesty's ship 'Challenger' is already bearing rich fruit—and continuing the somewhat unnatural, though tolerant, expression, of a voyage bearing fruit—although this fruit may be said to have been plucked before it is ripe, it is still of such growth and flavour as to be particularly gratifying to the palate, and such as to cause us to look forward to the greater pleasure of enjoying it when fully ripe.

This fruit then, as plucked by Dr. Carpenter, relates to the physical condition of the ocean depths in its circulation as revealed by its temperature at various depths, and for the development of which Dr. Carpenter is indebted to a valuable selection of extracts from Captain Nares's official reports, printed and circulated by the Lords Commissioners of the Admiralty, and which reports are accompanied by abstracts of deep sounding and graphic diagrams of ocean isotherms.

Dr. Carpenter refers to the prevalent belief which prevailed a few years back, in the uniform temperature of the deep sea being 39° Fahrenheit, and to the fact that this theory had been dispelled by the temperature investigations carried on in the 'Porcupine,' in 1869 and 1870, with the protected thermometers. A comparison between the temperature of the deep water of the Mediterranean and that of the oceanic water in the same parallel of latitude, the former being almost uniform and the latter the reverse, drew the attention of Dr. Carpenter to study the causes, and on which he based his theory, of the Polar water being the *primum mobile* of oceanic circulation, by a constant flow from the Polar regions setting at the bottom towards the Equator. This flow, by reducing the level, causes an indraught of surface-water from the circum-polar area, which, in turn, draws from the temperate and the latter upon the intertropical. This theory or doctrine Dr. Carpenter considers to be fully upheld by the researches of the 'Challenger.'

The first temperature-section across the Atlantic from Teneriffe to St. Thomas's, shows at its western end an exact conformity to the observations previously taken off the coast of Portugal. A remarkable feature is the uniformity of the depth at which the temperature of 49° was reached, especially as the western extremity is 10° further south than the eastern.

"Below this depth, a remarkable change shows itself, in the gradual upward slope of the isotherms of 45°, 40°, and 39°; so that the latter temperature, which was entered at the eastern end at 1000 fathoms, is encountered over the deepest part of the western basin at 850 fathoms, and the strata of 50°—45° and 45°—40° are by so much thinner. But the most significant phenomenon is the depression of the *bottom*-temperature from its remarkably uniform level of 35°·5 in the deepest portion of the eastern basin, to 34°·4 in the deepest portion of the western. This depression, taken in connection with other facts, clearly indicates that an under-flow of *Antarctic* water extends as far as St. Thomas's."

Leaving the sections north from St. Thomas as not bearing so much on the grand system of circulation, the second temperature-section across the Atlantic, from Bermuda to the Azores, still bore testimony to the correctness of Dr. Carpenter's views, the lowest bottom-temperature being 35°.

"The most noticeable feature in this section is the extension

* A paper read at the Royal Institution of Great Britain, by William B. Carpenter, M.D., LL.D., F.R.S., on Friday, March 20th, 1874.

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of the thick layer of 60°—65° as far eastwards as long. 41° W.; and then its rapid thinning, by the approximation of the isotherm of 60° to the surface. At the same time the isotherm of 40° gradually deepens; and the four intermediate bands resume nearly the same proportions that they present in the eastern part of the section from Teneriffe to St. Thomas's. Thus it is obvious that there is a much larger quantity of heat in the upper 300 fathoms of the *western* half of the Atlantic, between about lat. 25° N. and lat. 40° N., than there is in the *eastern*; and this is attributable to the reflux of that portion of the great Equatorial Current which never enters the Caribbean Sea or the Gulf of Mexico, but which, striking against the line of the West India Islands, the peninsula of Florida, and the coast of Georgia, is first deflected northwards, and then turns eastwards towards the Azores and the coast of Africa,—thus completing that *horizontal* circulation in the North Atlantic which is initiated by the Trade Winds. It is quite a misnomer to speak of this as "a branch of the Gulf Stream," since there is no evidence that it either enters or comes out from the Gulf of Mexico."

After proceeding to Cape Verde Islands, the voyage was continued to a position in latitude 3° N., and longitude 15° W., and the feature in this section most striking is—

"The progressive diminution in the thickness of the stratum above 40°, notwithstanding a progressive increase in the surface-temperature from 71° to 79°, consequent upon the approach to the Equator. Thus the isotherm of 40°, which at Madeira lies at about 900 fathoms' depth, and which halfway towards St. Vincent is about 950 fathoms, rises to 650 fathoms at St. Vincent, and at the Equatorial position actually lies at a depth of no more than 300 fathoms, below which, down to 2500 fathoms, the whole under-stratum has a temperature that falls very gradually from 40° to 35°."

The next section was carried obliquely across the Equator to St. Paul Rocks, Fernando Noronha, and Pernambuco; here the thinness of the stratum above 40° is most striking in comparison with the other sections, while the bottom temperature is colder, there being 33°·2 at 2275 fathoms, and 32°·4 at 2475, another proof of the Antarctic source of the bottom water.

Between the Abrolhos Banks and the Cape of Good Hope, the lowest bottom temperature on the western side of the Atlantic was 33°·1 at 2350 fathoms, and 32°·9 at 2650 fathoms on the eastern side; that a higher temperature should be found than at the Equator was not expected, but as the soundings were taken at widely separated stations, it is supposed that a deeper channel, with colder water at the bottom, exists between them.

The diagram of the isotherms in a north and south direction, illustrating the paper, clearly indicates the flow of the Antarctic water towards the Equator and North Atlantic.

The *rationale* of these phenomena is thus explained by Dr. Carpenter:—

"That any water which is *colder* than the Isocheimal (or lowest mean winter temperature) of the latitude, must have come from a source more distant from the Equator; and that if such water has a *glacial* temperature, it must have come all the way from one of the Polar areas."

It is but right to say that Dr. Carpenter submits that he has established a strong claim for the *provisional* acceptance of the doctrine, and he anticipates that this claim will be greatly strengthened by the temperature-section between the Cape of Good Hope and Melbourne, together with the north and south section between Kerguelen Land and the Antarctic ice-barrier.

To those interested in the physical condition of the ocean, and the somewhat vexed question of its circulation, this paper will prove a valuable contribution.

EXPERIMENTAL MILITARY SURVEY OF THE RUSSIAN CONFINES IN ASIA.*

III.

THE fifth and sixth sections of the Russian Asiatic confines, according to Colonel Veniukof's subdivision, form the line which passes from the Argun River at Abaigatu—the extreme western terminus of the Amur line—to Kuitun Mountain, at the point where the great Altai Mountains are intersected by the Little, or *Ektak*, Altai—a range which separates the Irtysh river system from that of the Kobdo.

The length of these two sections is 2100 miles. The greater portion of this frontier line, namely 1683 miles—from Abaigatu to Shabin-dabaga—was defined with great minuteness by treaty with China in 1728 (Count Raguzinskia, Kiakhta), and that definition was embodied again by Kropotof in the treaty of 1768, with but very little alteration; it was therefore established before any other boundary line between China and Russia, and is, moreover, the only section of the entire extent of the Russian borders in Asia which has been adhered to with an unwavering fidelity. From the earliest period named to the present time there has rarely been occasion for communications between the Russian and Chinese Governments on matters concerning trespass across this line, notwithstanding that nomads and hunters have always occupied the bordering lands on both sides. It was, however, only from lack of incentive to push forward in this direction that Count Muravief did not, in 1856, avail himself of the thirst for encroachment which was then so prevalent in Eastern Siberia. Strong representations were made to him on the subject, and it was argued that the treaty signed at Peking on the 20th of August (1st of September) 1727, might be employed in justification of the annexation of the basin of the lake Kos-Ogol, where gold-dust was reported to have been discovered by an enterprising Russian gold seeker. An officer who, in 1857, was deputed from Irkutsk to examine the outlying country in question, confirmed the previous accounts of it, and recommended its absorption by Russia. The Governor-General of Eastern Siberia would not, however, lend himself to so senseless a scheme, started by motives of selfish interest; at the same time he had on hand the completion of the grander design for the extension of Russian dominion along the seaboard of the Pacific.

The fifth section of this frontier terminates in the west at beacon No. 14, on the summit of Kyzynyktu-dabaga (N. lat. 51° 7′, and long. 119° 46′ E. of Ferro). A very short extent of it passes along ridges of mountains and other natural features of limitation, the greater length being drawn across an open country and constituting a so-called treaty boundary. The valley of the Selenga, the Yablonnoi range, and the Onon River break this line into four minor sections. Thus, the Trans-Baikal border land, which belongs to Eastern Siberia, comprises the districts of Nerchinsk, Chita, Selenginsk, and Verkhne-Udinsk, all of which, excepting Selenginsk, are called after small tributaries of the Selenga, Ingoda, and Shilka, at whose mouths the respective chief towns of those districts are situated. The northern half of the Trans-Baikal country, simi-

* Opyt Voënnago Obozrenia Rouskikh Granitz v. Azii.

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larly to a very large proportion of Russian territory in other parts of Siberia, is held to be an almost impassable wilderness of mountain and forest; it is far removed from the frontier, and is consequently denied participation in the trade which animates the few roads connecting the main centres of habitation in the south. The western extremity of this region, namely the territory lying to the west of the Selenga, and between the frontier and the southern end of Baikal, presents the appearance of a table-land, with a height of about 2000 feet, rendered fantastically dreary and desolate by a superstructure of jagged and bare rocks, among which there are many elevations of a very regular conical shape. The tract of land in question is frequently visited by earthquakes, which have produced an alteration of the course of the Selenga; this river has found a channel to the east of its former bed, from which it is separated by a row of high undulating hills. The country around the Baikal exhibits unquestionable evidence of volcanic action. Some of the ravines are filled with great masses of lava ejected from the various craters in the mountains, and hot springs are found in numerous places. The last fearful earthquake occurred in 1861, the shock of which was felt within a radius of fully 400 miles. According to a Mr. Stakheyef, the wells ceased to give water, emitting sand and gravel in its stead. The whole of the Trans-Baikal region is an upland with ranges of mountains more or less parallel with the frontier, stretching from W.S.W. to E.N.E.; the greatest depression is the basin of the Baikal, the "Holy Sea," with an almost unfathomable depth, which is 1316 feet above the level of the ocean; the highest mountain has an elevation of 8259 feet above the ocean level; this is the Chokonda, near Nerchinsk, in the Borchovochnoi Mountains, which skirt the Shilka. Radde calls this mountain Sokhondo, after the Tunguzes, who derive the word from Sokho, head or summit. Colonel Veniukof estimates the average elevation of the land at 3000 feet above the sea level, or rather says that would be the general altitude of the plain surface if the country could be levelled to a uniform height.

The mountain chains here are the south-eastern extremity of the Sayan, the culminating point of which occurs at Munku Sardyk (11,400), between Kos-Ogol Lake and the sources of the Irkut River. The direction of this portion (400 miles) of the Sayan chain is south-east, until it reaches the meridian of Kultuk on the Baikal; here it separates the affluents of the Angara from the head-waters of the Selenga. A little to the west of this meridian the Sayan forks into two branches, the main chain still proceeding S.E. and forming the southern limit of the basin of the Djida; the other branch, called the Khamar-daban, turning first due east and then north-east, forms the southern shore of the Baikal. These mountains rise to a height of from 4000 to 7000 feet above the sea level. The humidity here is extremely great; hardly a day passes without a shower or two or a fall of snow every day according to the season of the year, the consequence is an abundance of forest, or perhaps the moisture arises from the great quantity of forest in the mountains and from the swamps in the ravines—the prolific sources of innumerable streams. The mountains here do not exceed an elevation of 7000 feet, although they preserve a uniform height along the whole of the south-western coast of the Baikal. The highest peak known in this mountain mass does not reach the average altitude of the chain, and the summits are not covered with perpetual snow. The northern declivities of these mountains are invariably steep, while the southern sides are sloping. Moreover, the northern sides abound in torrents, while the southern slopes, affected by the dry atmosphere of the Mongol Steppes, yield few and inconsiderable streams. In the same way the northern declivities are densely forested, while the southern slopes are bare and mostly sterile.

On the right, or western, side of the Selenga, there is an entire system of parallel mountain chains. The Kentei and the Yablonnoi Mountains form one continuous chain, which merges into the Stannovoi range further north. The Yablonnoi range may be called the back-bone of the Trans-Baikal country. It is inferior in height to the Sayan at the western extremity of the region, its greatest elevation of 5000 feet occurring in the Kentei mountain knot. At its southern extremity the Yablonnoi range averages a height of 4000 feet, with precipitous sides all along the valleys of the Chita and Ingoda Rivers. The river systems of the Uda, which flows westwards to the Selenga, and of the Vitim, which runs northwards to the Lena, are separated by what may be likened to a gigantic fungus, grown out, as it were, from the Yablonnoi range at its central part. This is an immense swollen surface, called the Eravin Steppe. It forms an almost imperceptible water-parting between the above-named systems, and at one time it was possible to pass in boats from the Khilok, another affluent of the Selenga, to the Mongoloi, a tributary of the Vitim, through the series of lakes which are the common sources of those two feeders.

The valleys which separate the mountain chains of the Trans-Baikal region are those of the Selenga, or Tola-Selenga, Uda, Khilok, Chikoi, Ingoda, Onon, and Shilka Rivers, with those of their tributaries. These are mostly narrow, being on all sides walled in by mountains. With the exception of the Selenga, of the Ingoda from Chita, and of the Shilka from the point of junction of the Ingoda and Onon, these rivers are not navigable. Small boats and shallow craft can pass down the Khilok, and down the Onon from Akshi; but there are few such vessels afloat on their waters. There is no organised steam navigation either on the Selenga, the Ingoda, or the Argun. On the Shilka it is otherwise; but even on the latter river, as on the other navigable streams, the only plain craft on the broad bosom of their waters are barges of very frail construction, which are used for floating down tea from Kiakhta, or rafts for bringing down cattle to Nerchinsk and to the Amur. There is only one road connecting the Trans-Baikal region with Irkutsk, and consequently with the whole of Siberia. This was constructed in 1860: it passes round the southern extremity of Baikal Lake to the embouchure of the Selenga. The other trunk-roads are the one to Chita and Nerchinsk across the Yablonnoi range, and the other to Kiakhta; this latter is a carriage-road as far as the frontier (138 miles from Verkhne-Udinsk). From Kiakhta to Urga (207 miles) the road is not well suited for wheeled carriages, owing to the absence of bridges and to the flooding of the rivers.

The other roads are from Verkhne-Udinsk to

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Kudar on the right bank of the Chikoi; from Kliuchefsk picket on the Djida to Shimbelik on the Chikoi; from Shimbelik to the Ingoda across the Yablonnoi range; from Selenginsk to Petrofski *Zavod* on the Khilok; from Nerchinsk to Abaigatu (214 miles); from Nerchinsk through Chindant on the Onon to the Kerulun in Mongolia (372 miles), and so across the Gobi; from the Upper Onon to the Argun (475 miles), this road passing along the frontier, is lined with Cossack settlements, to which, as is the case in most parts where the frontier is open, are opposed military settlements of Mongols. From Urga there is a bridle-path to Kos-Ogol (521 miles), which was traversed by Colonel Helmersen, and a road for pack-animals to Verkhne-Ulkhinsk picket to the Onon (245 miles). From Urga there is a road on the Kerulun at Dalai-Nor (534 miles). Beyond Kerulun there are four well-known routes leading to Inner Mongolia.

Atkinson mentions a route which he says he followed from Selenginsk across the Chikoi, into the Khingan Mountains beyond the Russian frontier. He leaves it to be inferred that he reached the Kirulun River. There is indeed such a route from the sources of the Onon by those of the Kirulun to Urga, but it is only traversable by pack animals. In reading Atkinson's travels, it should be borne in mind, when he diverges from the well-beaten tracks within the Russian limits, that the same distinction should be made between his, "hence *my* route," and "after this *the* route goes," which the geographer is advised by M. Stanislas Julien, to draw between "*il arriva*" and "*on arrive*" in his preface to the *Memoires* of Hiouen-Thsang.

The road across the Gobi between Kalgan and Kiakhta is the ordinary well-known trade route, but the country of the Khalkas has been rarely traversed by, and is but little known to, Europeans. Two modern travellers, an Englishman and a Russian, have, however, contributed very much towards the solution of some interesting geographical problems in this region. The one is Mr. Ney Elias, who last year brought home the results of observations for longitudes and latitudes taken on a journey from Kalgan through Uliasutai, and Kobdo to Biisk, in Russian Siberia. "These observations," as was remarked by the President of the Royal Geographical Society, when Mr. Elias's paper was read, "will enable us for the first time to lay down the geography of Central Asia on a mathematical basis." He was accordingly awarded the Gold Medal of the Society. The other traveller is Mr. Paderin, who, although mentioned last, was in Uliasutai four months earlier than Mr. Elias. While Mr. Elias came up from the south, Mr. Paderin travelled from the east, namely, from Urga. Pursuing the official road, Mr. Elias came nearer to the supposed site of Kara-Korum, the capital of the early Mongols, than Mr. Paderin, if among all the remains of ancient cities which are to be found in Khalka, those located by Colonel Veniukof, under the name of Kara-Korum (say lat. 46° 50′, long. 120° 15′ E. of Ferro), at the sources of the Orkhon, at a distance of 40 miles due north from a point on the Kalgan Uliasutai route, which, according to the figures of distances given by Colonel Veniukof on his map, is almost exactly 301 miles E. S.E. of Uliasutai, are actually the remains of the "city" in question. Within a mile of the right bank of the Tui on this route, Mr. Elias saw the ruins of a city or fortress, which was probably Soin-Noin, 47° N.E. of the Kara-Korum on Veniukof's map, and, at a rough guess, in lat. 46° 59′, long. 119° 23° E. of Ferro.* Mr. Veniukof's location of Kara-Korum does not, however, agree with Paderin's statement as to its whereabouts, and the latter is positive that the ruins which he saw are those of the capital of Oktai and of Chingiz Khan—which he calls Khara-Kherem—or Khara-Balgasun. Colonel Veniukof, who published his work before Paderin's return to St. Petersburg, places Kara-Korum full 93 miles to the south-west of Ugei-Nor, while Paderin found them at two-thirds of that distance. These ruins, he says, are situated in a plain called Toglokho-Tolagain-tala. Having travelled 216 miles west by north from Urga to Tola, and across the Onon, Mr. Paderin reached the Ugei-Nor Lake. He had heard in Urga of the Ugei-Nor Lake, of the Morin-tologai Mountains, of Ulan-Chikhi, of the river Tamir, and of Khara-Balgasun, and prosecuted further enquiries about the locality when he crossed the Kharukh River. From Ugei-Nor he took fresh Mongol guides, and proceeded to the ruins, going S.S.E. After a sharp ride on horseback of about 4 hours across the Toglokho-Tologai plain, he came to the ruins, 50 to 60 versts distant from the station-house on the Ugei-Nor, at the south-eastern extremity of the plain, and standing some 6 to 8 versts off from the western bank of the Orkhon. It may be as well, while on this subject, to give a few more particulars from Mr. Paderin's notes on a subject so interesting to geographers. A wide expanse of meadow stretches between the river and the quadrangular enclosure. The wall, which has on all sides a face of 500 paces, and which is in parts crenated, is constructed of clay and unbaked brick: it is 10½ feet high. There are the remains of an inner and lesser wall, running parallel with the north and south sides of the enclosure. On the eastern side of the enclosure there is a turret, or a mound, which overlooks the outer wall. On the south and west sides of the ruin there are fosses, which are occasionally filled with rain-water. Near to Khodasan station, which is close to the banks of the Kharuk River, there is a Khitin-Khermé, or a monastic enclosure, in which, according to the Mongols, once dwelt a Khamba. The earthen embankment is only 7 feet high; the buildings within are tall; the roofs have disappeared; the walls are chiefly made of black flag-stones, cemented with a sandy clay slightly intermixed with lime. The buildings are very solid. Some unburned tiles were evidently used in the construction of these edifices. There are no traces of a wall within this enclosure.

Mr. Paderin's route from Urga inclined first to the south, and lay across the Tola, Kharukh, Orkhon, the two Tamirs, and the Chiluta Rivers, and then across a pass into the lake system of the streams running west and north-west. Beyond the pass the road, which is called the Sumo-Urto track, emerged on the high road to Uliasutai. The total distance from Urga to Uliasutai along this road is 576 miles, or 31 stages. From Kara-Korum, if Mr. Paderin's identification may be recognised, the Russian traveller returned to his track, striking it at Ulan-Khoshu, a stage beyond Ugei-Nor, and proceeded along the Morin-Tologa (horse's head) mountains, and past Ulan-Chikhi (red

* We have not seen Mr. Elias's map and are obliged to go to print without referring to the *Journal of the Royal Geographical Society*, for this year, in which it is said to be published.

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ear). Having thus far diverged from our special subject, it may not be out of place to add a short description of the country of the Ugei-Nor, from Mr. Paderin's notes. This country is a wide plain—the Toglokho-Tologain-Tala—surrounded by mountains of no great height. The lake lies on the northern side of the plain, near its hilly margin; the length of the lake from east to west is 8 miles; its breadth is about the same. The Khut'ukh'tu, Orombyin Gegen, resides in a building at the western extremity of Ugei-Nor, which appeared to Mr. Paderin to have been at one time the palatial residence of a khan. The foundation of this building, and the materials of which it is made, resemble those of the remains on the Khorukh. The Ugei-Nor is connected with the Orkhon by a stream called the Narin, which flows out of the lake. The Toglokho-Tologai extends about 50 miles from east to west, and is from 23 to 33 miles wide. It is intersected by the Orkhon, which is fordable, and which is skirted by salines and swamps, and fringed in parts with willows and poplars. On the western side of the Orkhon there is a series of salt lakes called Tsagan-Nors (white lakes), an appellation which the Chinese have erroneously extended to Ugei-Nor, confounding the latter with the lakes of the Tamir River system. The mountains on the western margin of the plain are called Ulintu, Obotu, and Ulan-Khashu; the Khadamtu mountains, which are covered with coniferous trees, form the eastern and southern limits of the Toglokho-Tologain-Tala.

Mr. Paderin, who refers also to a dilapidated wall or embankment on the Sumo-Urto route, viz., at Chintologoi on the Tola River, found no remarkable fragments or monuments of the past at Kara-Korum. The Mongols, in reply to his enquiries, told him the place was very old, and that it must have been the place of residence of Chingiz-Khan, while a Lama explained that it was the site of the city of Tagan-Timour. The place is indifferently called Kara-Korum, Kara-Kherem, Kara-Koram and Kara-Khelin. By Muhammadan writers it was called Ordu-Balik (*D'Hosson Hist. des Mongols*, t. 1, p. 76), or Belasagun, now written Balgasun, which, Mr. Semenof explains, was only a title. Balgasun is only another form for Balgada, which means residence. It appears also to have been called Kara-Korin, Kara-Khorin (from a river of that name), or Konin, when first founded by Bi-Kia A.D. 755. In 1228, Oktai, the son of Chingiz-Khan, made this place his head-quarters, moving from the banks of the Orkhon, where his father had permanently fixed his camp.

After this long digression, we will return to the Trans-Baikal region. The rivers are shallow, and the valleys, as we have said, are in rare instances open; this is particularly the case in Russian Daùria—the Nerchinsk mountain district—where, for instance, the Gasimur, Urof, Uriumkan and the Argun itself below Tsurukhotai, rush through mountain gorges, or wind through valleys not two-thirds of a mile wide. These are raw and unhealthy localities, which produce *goitre*. The country around the Barun-torei and Dzun-torei, and to the south-east of those lakes (between the Onon and the frontier), is covered with pools of stagnant water: this is an elevated steppe falling in gradients to the Dalai-Nor, which is itself 1800 feet above sea level. To the south is the high Gobi. At the sources of the Kerulun are the Kentei Mountains; the vegetation along the banks of this latter river is much poorer than that along the Onon, and it is everywhere fordable except in the spring; the Dalai-Nor is rapidly evaporating, and has no issue except when it is flooded.

The climatic conditions of the country are unfavourable to cultivation, a circumstance which is aggravated by the sparseness of the population and the rude condition of the people. The whole of the Trans-Baikal region embraces 228,900 square geographical miles of territory, and Colonel Veniukof observes that of this area barely 25,200 square miles are suitable for purposes of agriculture. The inhabited portion of this Russian outskirt may, however, be said to measure 600 miles in length by 270 miles in breadth, which gives the Russians 54,000 square miles of border land, with a more or less settled population. The inhabitants of this border may be said, however, to number not more than 388,000, of whom 260,000 are Russians; these are chiefly grouped in large towns and villages in the basin of the Selenga, and scattered throughout the Nerchinsk district. Next in number are the Mongols and Buriats. The wealth of the aborigines consists in their herds and cattle. According to Colonel Veniukof's estimate, they possess in the aggregate about 400,000 horses, 500,000 head of horned cattle, and over a million sheep. This in itself is enough to convey a fair idea of the character of the country and of the condition and form of life of the people. The most industrious class among the Russians are the so-called "families" of old believers on the Khilok and Selenga, in the Nerchinsk district, on the Ingoda and Argun Rivers. These people content themselves with labouring on the soil, although they find it exceedingly difficult to dispose of their produce, owing to the want of proper ways of communication. Their cattle are the best in the region, but are small; these, however, are sent in great quantities down the Argun to the Amur. There is no manufacturing industry in the region. Mining and gold washing occupy the chief attention of the Russians. The quantity of gold-dust obtained in 1869 was 382 puds, valuing about 4,000,000 roubles. The working of the silver mines had almost entirely ceased, and only 40,000 to 45,000 puds of iron ore were obtained, and that at the Petrofski *Zavod* alone.

Regarding the Trans-Baikal border-land in the light of a probable theatre of war, Colonel Veniukof observes that it is divided into two such fields for operations which are in no way connected one with the other. To the west of the Yablonnoi range, the valley of the Selenga and the Khamar-Daban Mountains are the only features of strategical importance; the valley of the Selenga could alone serve as a basis for operations whether defensive or aggressive, while an enemy could penetrate into the country from all points along the line of frontier, and the Trans-Baikal region could be successfully held against a powerful enemy, only so long as the passes across the Khamar-Daban are commanded from the north. The defile through this range at Verkhne-Udinsk is not guarded at all, so that a bold Chinese general might any day cut off the greater portion of the Trans-Baikal country, as well as the entire province of the Amur from the rest of Siberia. To the east of the Yablonnoi range the character of the country as a field of military operations is quite different. This arises from the circum-

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stance of the rivers there running parallel with the line of frontier, and from the greater quantities of forest on the mountains; here, too, the population is more evenly distributed. There is here no such naturally defined line of operations like that of the Selenga. In the event of a war with China, troops might be concentrated at Chindant, and from thence moved on to Khailar, along the frontier. The Cossack troops on the Trans-Baikal frontier consist of six cavalry regiments, nine battalions of infantry, and one battery. The arsenal of the circuit of Eastern Siberia is at Chita. The arms for the Cossacks are brought from St. Petersburg, whither they are also sent for repair.

The country beyond the Russian frontier in this direction is Khalka, or Northern Mongolia. The Mongols are governed by Ambans in Urga; among these, however, the senior is invariably a Mongol, the second being a Manchu. These Ambans wield only a political power. The internal administration among the Mongols is in the hands of the Khans—Tsetsen and Tushetu—whose lands border this section of the Russsan line; in those of chiefs of banners—dzasakams (subordinate to the former)—and in those of the Khut'ukh'tu of Urga, who is a mere puppet in the hands of the Manchus. Tsetsen and Tushetu have their residences on the Kerulun and Onon Rivers. The Mongol forces, or militia, in Khalka number 15,000, the population in this part of Chinese Mongolia being 213,000 persons, grouped over a stretch of country having a width of 200 miles from the Russo-Chinese frontier.

Without stopping to describe the process of rectifying the frontier marks which is periodically gone through by the Russian and Chinese official, we must now pass on to the Altai-Sayan section of the Russo-Chinese frontier, over which, however, our space will not allow us to linger long. As a political frontier, it might perhaps be best described in a list of the 122 piles of stones and other marks which define it along the ridge of the almost impenetrable range of mountains from the sources of the Irkut, Belaya, and Oka rivers in Eastern Siberia.

The results of the observations made for altitudes at the eastern extremity of this chain by Mr. Radde in 1855, have been given by that eminent zoologist and botanist in his valuable reports to the Russian Geographical Society, of which I purpose shortly to publish a full translation. The Munku-Sardyk mountain knot, at the sources of the rivers above named, has a height of 11,400 feet above the level of the sea; yet, according to Radde, it does not rise much above the neighbouring ridges. After Pallas, in 1772, and the naturalist Turchaninof—1828 to 1836—Mr. Radde was the first to carry scientific exploration into this region. The Altai-Sayan range separates the country of the Urian-Khai Mongols from Siberia so effectively that it affords easy ingress only at its western extremity. There are, however, fourteen known passes across the Altai-Sayan chain. The routes here which lead to the south are those from Ust-Kamenogorsk to Kobdo; from Biisk to the Kak or Khak picket-post at the sources of the Kobdo River. The route from Ust-Kamenogorsk connects all the Russian settlements along the Altai in this section of the frontier, and in the 17th century it formed the so-called Biisk line of frontier—492 miles long. The Shabin-Dabaga mountain knot — famed for the earliest mark limiting the Russo-Chinese frontier in this direction—stands at the sources of some affluents of the Abanan, Yenisei, and Kemchik rivers. There is here a very difficult pass into the country of the Urian-Khais which leads to the river Ak. Atkinson's illustrations give an excellent idea of the grandeur of the scenery in these mountains, although he did not penetrate far into them.

With the exception of a very few settlements, there is hardly any Russian population within 100 miles of this line, which is the most secure section of the entire Russian Asiatic frontier. The Russian military forces here are very slender, and those of the Chinese still more insignificant, nature having supplied the elements for so secure and permanent a boundary as no human efforts have ever succeeded in fixing in Asia. But if the passes over the Altai are difficult or impracticable, the flank of the countries of the Kos-Ogol, Ubea, and Ike-Aral, water systems, can be easily turned from the Bukhterma and other points at the eastern extremity of the Russian Semirechensk province. The valley of this river is the best locality in the Altai region, but this is as yet an undeveloped corner of the Russian Asiatic possessions. Some interesting papers have been drawn up by Russians, on the routes from Biisk and elsewhere in Siberia to Kobdo and Uliasatai. Among these is a paper written, in 1864, by Mr. Printz on a journey to Kobdo by way of Suok, which we dare not more than allude to, having already we fear drawn this notice to too great a length. We are here reminded of the necessity to close, and although we do so abruptly, we find an excuse in the brevity with which the Altai-Sayan section of the frontier is treated by Mr. Veniukof, not, doubtless, because of the paucity of geographical material to work upon, but because of the little interest this section offers from a military strategical point of view.

The mineral wealth in the Altai is exceedingly great, but the mountains are not made to yield more than a very small proportion of their immense natural wealth. According to the ancients, here somewhere dwelt the Argippiæ; the Issedones probably occupied the lands on the south side of the Altai's, beyond which nothing could be gleaned by Herodotus from those people. This, too, was probably the country of fabulous wealth possessed and defended by the "Gryphins," or Gryphons. Here, if anywhere, lodged the mythic Arimaspians, or one-eyed people; and this, we presume, was the awfully grand mountainous region of Gog and Magog, of which we know as little as though it had not been in European hands for upwards of a century.

ROBERT MICHELL.

(To be continued.)

THE COMPETITIVE GEOGRAPHY, by *R. Johnston*. Second edition. 8vo., pp. 520. London (Longmans & Co.), 1874.

WE dare say Mr. Johnston's treatise on geography will be acceptable to teachers and candidates who present themselves at the competitive examinations held periodically for entrance into the Army and Civil Service. It is a volume of small bulk, yet it contains an immense amount of information, arranged perspicuously, and to be depended upon as a rule. The author claims the forbearance of his readers with respect to any slight

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inaccuracies which may be found in his work, notwithstanding all efforts to exclude them, and we think he is justified in doing so. But forbearance must have its limits, and sometimes Mr. Johnston tries our temper to an extent almost beyond endurance. Where, for instance, did he learn that Jeb-Ahloor is the highest mountain in Africa; and why will he persist in giving the number of inhabitants of countries, without mentioning the year to which the information applies? The list of British Colonies, too, requires amendment. The omission of small places, such as Ascension, Lagos, and Ceylon, may possibly be forgiven, but it is too bad that the results of the Imperial Census taken in 1871 should have been neglected almost altogether, and that Bengal, with its 66,856,859 inhabitants, should figure in his list with a population of only 35,321,000. The figures throughout the volume should be carefully revised, and the book may then become a trustworthy guide to the student.

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THE HISTORY OF JAPAN FROM THE EARLIEST PERIOD TO THE PRESENT TIME. Vol. I. To the year 1864. By *F. O. Adams, H. B. M.'s Secretary of Embassy at Berlin, formerly Chargé d'Affaires at Yedo.* London (King & Co.), 1874.

MR. ADAMS intends his work to be a "comprehensive narrative of the principal events in Japan, from the earliest period up to the present time." He devotes the first hundred pages of the present volume to a sketch of the earlier history of Japan to 1852, and the remainder to the more recent occurrences. He claims to have compiled his work from the best official and native sources within reach, and we are happy to be able to congratulate him upon the clear and readable narrative of events which he has produced, and which cannot fail to attract the attention of all persons interested in Japan, and the East generally. The author deserves credit, too, for the care which he has bestowed upon the spelling of proper names, a subject which many of our more popular writers seem to look upon as being beneath their notice.

But whilst thus fully admitting the merits of Mr. Adams' work, we cannot help taking exception to the cursory way in which certain passages of Japanese history are treated. Considering that Japan is one of the most ancient empires in the world, that her historical records date back for many hundred years, and Europeans first came into contact and conflict with her as early as the sixteenth century, we think a hundred pages hardly sufficient to do justice to this earlier history up to 1852. The author has based this part of his work almost exclusively upon Japanese sources, rendered available by Mr. E. Satow, the learned secretary of the English Legation at Yedo. He has not thought it worth while to consult the voluminous materials published by Siebold, whose work, in spite of all that has been published since, still remains the standard authority on many subjects connected with Japan, or the scattered notices to be found in earlier writers. The interesting episode of the introduction of Christianity into Japan, and its subsequent extirpation, is thus passed over very lightly, much to our regret, for we feel sure that even a small amount of historical research would have thrown fresh light upon this epoch of Japanese history, which gains in interest from similar conflicts between Church and State now going on before our eyes. Passing to a more recent period, we feel surprised that Russia should not be mentioned once in the pages of this volume. There is no account referring to the transactions between Russia and Japan since 1792, not a word about Putiatin's mission in 1857, nor about Russian encroachments on Sakhalin and in the Kurile Islands. Surely Mr. Adams's official position does not satisfactorily account for this singular silence.

On the other hand, everything referring to the transactions between Japan and England is discussed fully; the official despatches are frequently given *in extenso* (though without the plans accompanying them), and we can only repeat that the work is full of information and eminently readable.

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I. DIE DEUTSCHE EXPEDITION AU DER LOANGO KUSTE NEBST ALTEREN NACHRICHTEN UBER DIE ZU ERFOSCHENDEN LANDER. *Von Adolf Bastian*, Jena. 8vo., 374 pp. London (Trübner & Co.), 1874.

II. CORRESPONDENZBLÄTTER DER AFRIKANISCHEN GESELLSCHAFT. Nos. 1 to 6.

IT was chiefly through the travels of Livingstone and Schweinfurth, that, in 1872, the attention of the Berlin Geographical Society was turned to the great desirability of exploring equatorial Africa. Communications were entered into with other German Societies, and delegates from Leipsic, Dresden, Munich, Frankfort, and Hamburg, having assembled in Berlin, the German Society for the Exploration of Equatorial Africa, was formally organised on the 19th of April, 1873; and Dr. Bastian, the ex-president of the Berlin Geographical Society, a gentleman well known for his travels in Siam, Cambodia, China, and the Indian Archipelago, as well for previous acquaintance with that very part of the African coast it was now proposed to start from, was deputed to look for a suitable spot to erect a coast station at. In the volume he has just brought out Dr. Bastian details his experiences, and the information he acquired during his three months' sojourn in the coast lands, a task not fulfilled without severe physical prostration through fever. But before noticing his labours it may be convenient to glance at the programme of operations determined on by the Society and the steps taken to carry it out.

As already stated it was probably the success of Dr. Schweinfurth that encouraged his countrymen to follow in our wake, by organizing a second "African Association." The commercial prizes to be won were great, and since the abolition of the West Coast Slavery, the Dutch had actually made a commencement by building a few factories. Copper, ivory, wax, tamarinds, groundnuts, coffee, cotton, gum copal, palm-oil, and various kinds of dyes were amongst the products which the country yielded, even to profusion. The object to be sought was the eventual thorough exploration and throwing open to trade of the huge blank on the map of equatorial Africa, by starting from a basis established on the coast, and thus connecting by a network of routes, the extreme points reached by Du Chaillu, Schweinfurth, and Livingstone.

An energetic leader for the expedition was found in Dr. Güssfeldt (whose qualities, it may be observed, Dr. Bastian extols in the highest terms), his companion being Herr Von Hattorf; while Drs. Falkenstem and Soyaux were appointed zoologist and botanist respectively. Furthermore, Dr. Lenz, a geologist, has been despatched to the mouth of the Ogowai River, with instructions to work inland in concert with the Loango Coast Expedition. The unlucky mishap which befell the 'Nigritia,' — Drs. Güssfeldt's and Von Hattorf's vessel—just after leaving Sierra Leone, was chronicled in our columns, and will be fresh in the memories of our readers. Eventually, however, Bananas was reached on the 25th of July, and shortly afterwards they met Professor Bastian and Von Görschen at Cabinda. Bastian, in the meantime, had been exploring the coast lands, with the view of selecting a suitable site for a depôt. Futila, the Chiloango River, Landana, Chinsonso, Chikambo, Loango, and the Quillu River, were all visited in turn, and the advantages of each place are carefully discussed in the volume now before us. The Quillu River appeared very deserving of research. It is evidently an important stream, and, according to the native accounts, is connected with the

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Zaire or Congo. The former kingdom of Loango has now shrunk to very insignificant dimensions, and embraces barely more than the country between the Quillu and Luema Rivers; a decline in the greatness of monarchy chiefly attributable to the levelling tendencies of legitimate trade. Formerly, the slave-trade was a monopoly vested in the hands of the princes and chiefs, but now every native can procure a gun and ammunition, and make himself independent, while the real power is centred in the hands of the richest traders. At last an empty Dutch factory was discovered at Chinsonso, and communication with the interior being practicable, and Landana, which is now a thorough European settlement, being within easy distance, it was determined to settle there, and after some necessary repairs, the house, containing a dining room, three small sleeping apartments and outhouses, was finally made habitable by the second week in October.

Dr. Güssfeldt then set out, on the 16th of October, for his projected preliminary journey up the Quillu River. After being detained for a short time at Black Point through fever, he began to proceed up-stream on the 26th of October, laying down a route survey as he went along by means of a chronometer, and prismatic compass. At its mouth the river has a bar, while the right bank has within the last five years been carried away by the force of the water, so that the site of some old factories is now under water. The average breadth of the stream is 400 paces, though in some rocky narrows close to Gotu, it shrinks in breadth to only 25 paces; 29 miles above the mouth, in a direct line, lies a trading station called Chimbak. Here Güssfeld trested four weeks, living in a sort of shed built on piles, and feeding on cassava, fowls, and palm-nuts. From thence he proceeded up as far as the Bumina rapids, the narrowness and rocky nature of the stream making travelling a very slow affair. After some progress up-stream, Güssfeldt was in a position to ascertain the general character and course of the Quillu. It proved to flow first north-east and then north-north-east, its breadth averaging about 150 paces, and then to dash into a rocky channel no more than 50 yards wide, with high precipitous walls of rock on either hand. On observing this feature a little more attentively, Güssfeldt saw that here, as well as at Gotu, a little lower down, the Quillu breaks through one of the many parallel mountain ranges which run north-west and south-east. A journey of four hours brought him to the Mayombe country (not to be confounded with Mayumba, about 4° south latitude on the coast), and, after a friendly reception by the chief, Güssfeldt engaged a party of bearers to accompany him to the Yangela country, the limit of his excursion.

This journey of Dr. Güssfeldt is important, inasmuch as it will very probably be by this route that the Expedition will endeavour to penetrate into the interior. The rainy season, which, from last advices (dated 29th of January) had set in vigorously, will preclude all active operations for some considerable time. We hope, however, shortly to be in a position to lay before our readers an account of the further preparations and movements of the Expedition.

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REPERTORIUM VAN DE KOLONIALE LITERATUUR, ENZ; door *J. C. Hooykaas*, Ter prese bezorgd door Dr. W. N. du Rieu. Amsterdam, 1874. Part I. London, Trübner & Co.

THE ever increasing number of articles inserted in periodical publications and the transactions of scientific societies, render a bibliographical guide, such as the one now before us, of immense service to the student. Mr. Hokyas, the originator of this work, did not live to see it completed. He died in 1870, and the materials which he had been at the pains of collecting in the course of many years' research could not have fallen into better hands than those of Dr. du Rieu, the editor of the present work, and who has been assisted in his arduous task by Professor P. J. Veth, W. Marshall, A. C. Vreede and others. The work will contain references to papers of all kinds, referring to the Dutch possessions to the east of the Cape of Good Hope. The first part, now published, gives 4455 references bearing upon "the Land," and is therefore of special interest to geographers. The parts which are to follow will refer to "The People," "Administration," and "Science." A concluding volume will contain indices and a register of dates.

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DIE ARALSEEFRAGE. Von *Robert Roesler*, Corr. Mitglied der Kais. Akademie der Wissenschaften. Wien, 1873. 88 p.p., 8vo. London, Trübner & Co.

THIS work is a reprint of a most exhaustive essay (originally read before the Vienna Scientific Academy) on the Sea of Aral. The various points selected for discussion by the author are the following: the question of an original communication between the Caspian and Aral Seas, and the testimony on this head; the probable former courses of the Lower Oxus and Jaxartes; the question as to the existence of an ancient commercial route by water between the Caspian and Upper Baktria, and lastly, the proof extant as to the separate existence of the Sea of Aral in times past.

The author's researches have led him to examine every conceivable authority; Greek, Latin, Arabic, Persian, Russian, English, and German authors, all have been ransacked, and with all their writings and languages Herr Roesler appears equally familiar. The result of his investigations (which agree in the main with those of Sir R. Murchison, though formed independently) is to arrive at the conclusion that at a remote geological (not historical) epoch, the Aral and Caspian formed one common inland sea, and that the lofty Ust-Urt plateau gradually uprose between the two seas, which however still continued united by a common arm to the south, till a further upheaval of the soil effected a complete separation. The classic authorities (Herodotus alone excepted) make the Oxus discharge itself into the Caspian, and three of them agree in fixing the mouth opposite to that of the Araxes. It is impossible to tell for certain, but it is probable that one arm flowed northward and was lost in the sands, and the other westward to the Caspian, while it is also likely that after once reaching the depression of its present delta, the river never changed its course. The Arabian writers of about the 10th century after Christ, on the contrary, describe it as flowing into the Aral. A careful comparison of the data points to the conclusion that the change in the river's direction must have taken place between the 6th and 11th centuries of our era, and probably began as early as the year 330 A.D., though Roman writers are silent on the point. After the 14th century, the accounts respecting the course of the Oxus differ in rather a perplexing manner. Gonzalez Clavijo, Abul-Ghazi, Kyatib-Chelebi, and Hanway, speak of its return to the Caspian, while Jenkinson speaks equally positively of its flowing into the sea of Aral. On this point the author decides, apparently a little hastily, that the accounts are too unreliable to enable one to form a satisfactory opinion.

Herr Roesler does not deny that a trade route for the conveyance of Indian goods to the Caspian may have sprung up along the Oxus, but it must have been a mere temporary affair and subject to interruptions from physical causes.

This treatise is a most valuable contribution to the comparative and historical geography of the Lower Oxus, and it is impossible to refrain from admiration of the diligence shown in the accumulation of data, as well as of the judgment exhibited in its utilization.

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Bibliography.

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ASIA.

SEVERTSOF (N.) Travels in Turkestan and Researches on the Thian-shan. 8vo. pp. 497. Map. St. Petersburg, 1873. (In Russian).

WENJUKOW (Colonel). Die Russisch Asiatischen Grenzlande. Map. In parts of pp. 144. Leipzig, 1874. Parts 1 and 2. 6d.

PETZHOLDT (A.) Turkestan. Auf Grundlage einer 1871, unternommenen Bereisung des Landes. 8vo., pp. 94. Leipzig, 1874. 4s.

KHIVA and Turkestan. Translated from the Russian by Captain H. Spalding. Map. 8vo., pp. 252. London, 1874. 9s.

KER (D.) On the road to Khiva. Illustrations and Map. 8vo. pp. 370. London, 1874. 12s.

VAMBERY (A.) Central Asia and the Anglo-Russian frontier question. 8vo., pp. 386. London, 1874. 9s.

RADDE (Dr. J.) Vier Vortraege über den Kaukasus Supplement No. 36 of Dr. Petermann's "Mittheilungen." Maps. 4to., pp. 78. Gotha, 1874. 4s.

MITZULL. Agricultural description of Sakhalin. St. Petersburg, 1873 (in Russian).

HELLWALD (F. von.) The Russians in Central Asia. Translated by Colonel Wirgman. Map. 8vo., pp. 332. London, 1874. 12s.

MENTABERRY (A.) Viaje à Oriente. De Madrid à Constantinopla. 8vo., pp. 582. Madrid, 1873. 12 rs.

MÖLLER (P. v.) En utflygt till Orienten. 8vo., pp. 135. Göteborg, 1873. 2s. 6d.

TAYLOR (Bayard.) Travels in Cashmere, Little Thibet, and Central Asia. 12mo., pp. 365. New York, 1874. 7s. 6d.

HUNTER (W. W.) Famine Aspects of Bengal Districts. 8vo., pp. 204. London, 1874. 7s. 6d.

BACON (Rev. G. B.) Siam. Map and Illustrations. 12mo. New York. 7s. 6d.

CHINA. Commercial Reports from H.M.'s Consuls. No. 3, Part II. (Parl. Paper, 862 I. Session 1873). London, 1874. 8d.

JAPAN. Commercial Reports from H.M.'s Consuls. No. 2, Part II. (Parl. Paper, 863 I, Session 1873). London, 1874. 2d.

MOSSMAN (S.) New Japan, the Land of the Setting Sun; its animals during the past twenty years; recording the remarkable progress of the Japanese in western civilization. Map. 8vo., pp. 488. London, 1874. 15s.

ADAMS (F. O.) The History of Japan from the earliest period to the present time. Vol. I. 8vo., pp. 560. London, 1874. 21s.

KUDRIAFFSKY (E. von.) Japan. Vier Vortraege, nebst Anhang Japan. Original Predigten, 8vo., pp. 208. Vienna, 1874. 5s.

LITH (P. A. van der.) Nederlandsch oost-Indië, beschreven en afgebeeld voor het nederlandsche volk. Illustrated. 8vo. Doesborgh, 1874. 10s. 6d.

STOEHR (E.) die Provinz Banjuwangi in Ost-Java m. d. Vulkangrouppe Idjen-Raun. Reiseskizzen. Plates. 4to., pp. 118. Frankfort O.M., 1873. 8s.

AUSTRALASIA.

TROLLOPE (Anthony.) New Zealand, being a portion of a work entitled "Australia and New Zealand." 12mo., pp. 166. London, 1874. 3s.

MISSIONSGESCHICHTE IN HEFTEN, (by Rev. Schwarzkopff.) Heft 7. Polynesien, oder über Tahiti nach Erromanga. Map. 8vo., pp. 362. Berlin, 1874. 9d.

CAMPBELL (F. A.) A year in the New Hebrides, Loyalty Islands and New Caledonia. Illustr. 8vo. Geelong (Victoria), 1874. 12s.

AFRICA.

GORDON (A. G.) Life on the Gold Coast (1847-8). 8vo., pp. 82. London, 1874. 2s. 6d.

SKERTCHLEY (J. A.) Dahomey as it is: being a narrative of eight months' residence in that country. Illustr. 8vo., pp. 544. London, 1874. 21s.

LAFITTE (Abbé.) Le Dahomé, souvenirs de voyage et de mission. 8vo., pp. 252. Tours, 1874.

HENTY (G. A.) The march to Coomassie. 8vo., pp. 466. London, 1874. 15s.

ROGERS (Capt. E.) Campaigning in Western Africa and the Ashantee invasion. 8vo., pp. 204. London, 1874. 5s.

STANLEY (H. M.) Coomassie and Magdala: the Story of Two British Campaigns in Africa. Illustr. Maps, 8vo., pp. 514. London, 1874. 16s.

SEDDALL (Rev. H.) The Missionary History of Sierra Leone. 12mo., pp. 256. London, 1874. 5s.

FORBES (A. G.) Africa: Geographical Exploration and Christian Enterprise. 8vo., pp. 430. London, 1874. 7s. 6d.

FRERE (Sir Bartle) Eastern Africa as a field for Missionary Labour: Four Letters to the Archbishop of Canterbury. Map, 8vo., pp. 122. London, 1874. 5s.

ROHLFS (G.) Adventures in Marocco and journeys through the oases of Draa and Tafilet. With introduction by Winwood Reid. 8vo., pp. 380. London, 1874. 12s.

ROBERTS (J. S.) Life and exploration of David Livingstone. 8vo., pp. 314. London, 1874. 3s. 6d.

NORTH AMERICA.

ANDREWS (I. W.) Manual of the Constitution of the United States, designed for the instruction of (precocious) American youths in the duties and rights of Citizenship. 12mo., pp. 370. Cincinnati, 1874. 10s.

PACHMAYR (J.) Leben u. Treiben der Stadt Neu-York u. Hinweis auf die Einwandering u. d. deutsche Element. Kulturhist. Bilder. 8vo., pp. 164. Hamburg, 1874. 2s.

UNITED STATES Register or Blue Book for 1874: with political and statistical information relating to the separate states and territories of the continent of America; also the census of the United States, &c. 8vo., pp. 176. New York, 1874. 10s.

IOWA. Manufacturing, agriculture, and industrial resources of Iowa. 16mo., pp. 160. Des moines.

THOMPSON (J. P.) Church and State in the United States, with an appendix on the German population. 16mo., pp. 166. Boston, 7s. 6d.

WOOLSON (A. G.) Women in American Society. 12mo., pp. 271. Boston, 7s. 6d.

LABOUR. Fourth Annual Report of the Bureau of Statistics of Labour (of Massachusetts), embracing the account of operations and inquiries from March, 1872, to March, 1873. 8vo., pp. 522. Boston, 7s. 6d.

VERNON (E.) The American Railroad Manual for the United States and the Dominion. Maps. 8vo., pp. 720. Philadelphia, 36s.

YOUNG (A. W.) History of Wayne Country, Indiana, from its settlement to the present time. Portraits and Views, 8vo., pp. 459. Cincinnati. £1 5s.

NORDHOFF (Ch.) California; for health, pleasure, and residence. A Book for Travellers and Settlers. 8vo., pp. 256. New York, 12s. 6d.

KNEELAND (Sam.) The Wonders of the Yosemite Valley and of California. Photographs and maps and woodcuts. 8vo., pp. 98. Boston and New York, 1872. £1 8s.

PHILADELPHIA and its environs. An illustrated description of the City. 2nd ed., 8vo. Philadelphia. 2s. 6d.

CHAMBERLIN (E.) Chicago and its Suburbs. Map and illustr. 8vo., pp. 468. Chicago, 1874. 12s. 6d.

COLVIN (V.) Report of a Topographical Survey of the Adirondack Wilderness of New York, 8vo. Maps. New York, 7s. 6d.

KNAPP's History of the Maumee Valley. Illustr. 8vo., pp. 700. Toledo, 32s.

DEARBORN (R. F.) Saratoga and how to see it. 12mo. New York. 4s.

BACHELDER (J. B.) Illustrated Tourist's Guide to the United States. Popular resorts and how to reach them. Illustrations, 8vo. Boston, 10s.

LESTER (J. E.) The Atlantic to the Pacific: what to see and and how to see it. 12mo., pp. 350. New York, 7s. 6d.

THE Atlantic Coast Guide: a companion for the Tourist between Newfoundland and Cape May. 16mo., pp. 136. Maps. New York, 1874. 5s.

EASTMAN'S Eastern Coast Guide: A hand-book of the Coast from Newport to Mount Desert. 16mo. Concord, N. H. 7s. 6d.

MOORMAN (J. J.) Mineral Springs of North America: How to reach, and how to use them. Illustr., 12mo. Philadelphia, 10s.

NEW ENGLAND. A hand-book for Travellers, with the western and northern borders, from New York to Quebec. Plans. 16mo., pp. 400. Boston, 10s.

GEOLOGICAL Survey of the United States. List of elevations in that portion of the United States west of the Mississippi. Arranged by H. Gannett, Assistant to the U. S. Survey of the territories, F. V. Hayden in charge. 8vo., pp. 48. Washington, 1s. 6d.

MAY (John, of Boston.) Journal and Letters relative to two journeys in the Ohio country in 1788 and 89. With biographical sketch and illustrative notes by the Rev. R. S. Edes and W. M. Darlington. 8vo, pp. 160. Cincinnati, 12s.

CROFUTT (G. A.) Trans-Continental Tourists' Guide. vol. 5. New ed. Illustr. and maps. 12mo., pp. 224. New York, 6s. 6d.

BELL (Capt. W. H.) Quiddities of an Alaskan Trip. A series of illustrations burlesquing a trip to Alaska. 4to., pp. 61. Philadelphia, 18s.

SOUTH AMERICA.

DAS Kaiserreich Brasilien auf der Wiener Weltausstellung v. 1873. 2 maps. 8vo., pp. 408. Rio de Janeiro, 1873. 3s.

L'EMPIRE du Brésil à l'exposition de Vienne en 1873. 2 maps, pp. 364. Rio de Janeiro, 1873. 3s.

MOUCHEZ (E.) Les côtes du Brésil, description et instructions nautiques. 1re section. Cap San Roque à Bahia. 8vo., pp. 178. Paris, 1874. 2s.

KELLER-LEUZINGER (F.) Vom Amazonas u. Madeira. Skizzen u. Beschreibungen aus d. Tagebuche einer Explorations reise. Illustrations. Folio, pp. 166. Stuttgart, 1874. 32s.

HUTCHINSON (T. J.) Two Years in Peru; with explanations of its antiquities. Map and illustrations. 2 vols. 8vo., pp. 650. London, 1874. 28s.

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Cartography.

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Maps of Norway.

THE facilities of travel attract to Norway a number of tourists increasing from year to year, and for their guidance, as well as for the information of geographers generally, we think a notice on Norwegian maps may prove acceptable at the commencement of the travelling season.

In Norway, as in most other countries of the world, the surveys and their publication are entrusted to a Topographical Department—in this special instance known as *Geografiske Opmaaling*—under the direction of military officers. The earliest publications of the Norwegian Topographical Office date from the year 1826, when a map of the Amt Smaalene was published on a scale of 1 : 200,000. This map, like some of those which succeeded it, was engraved at Paris, but at an early date the Norwegians began to do their own engraving, and there is no doubt that the work turned out at Christiania need not fear comparison with the work of Parisian gravers. This first map was succeeded, in 1829, by a map of Agershuus, in 1829 by one of Hedemarken, and in 1832 by one of Jarlsberg and Laurvig. For these earlier maps we are indebted to Captains N. Ramm and G. Munthe. It is to these officers that we are indebted for the harmonious combination of contoured and horizontal shading which forms a characteristic feature of all official maps of Norway down to the present time. There is no doubt that this system is adapted to the features of the country, and if applied artistically, none of those unpleasing contrasts are observable which might be expected—the barren mountain region, shaded horizontally, and the more gentle and cultivable hill-tracts* shaded vertically, being easily distinguishable without offending our idea of the beautiful in cartography. It is only natural that the first essays in this style should not have perfectly succeeded, and it therefore reflects no discredit on the officers named when we state that the maps done by their successors, Captains Gjessing and Andersen, surpass their workmanship in beauty of execution. This remark applies with peculiar force to Captain Gjessing's map of Stavanger Amt, published in 1860, which may be looked upon as worthily representing this style of delineation. We have given below the titles of these "Amt" maps published up to the present time, and it will be seen from this list that there remain still to be published maps of Northern Bergenhuus, Romsdaal, the two Throndhjems, Nordland and Finmark, the area of which is almost equal to one-half of that of the entire kingdom. The only map on a large scale which furnishes information with respect to this thinly inhabited portion of the kingdom is that of Finmarken prepared by W. Haffner, an officer of the Topographical Department, who has been able to avail himself of the surveys made in 1869 and 1870, by Captain Baug in the district of Tromsö, where boundary disputes had arisen between the nomadic inhabitants. This map extends from the Alten fiord to the Russian boundary, its nomenclature is abundant, and although the hills are but slightly sketched in, there are numerous altitudes to guide our judgment with respect to the orographical features of the country.† Another map of Finmark is that by J. Fries, published in 1861, which is perhaps the most minute ethnographical map ever published, for it shows every house or hut, and distinguishes the language or languages spoken by the inmates in a simple and comprehensible manner.*

The old surveys, however, were found not any longer to answer the more exacting requirements of our time, and a fresh survey was begun in 1862, when two base-lines of about 12,000 feet each were measured at Christiana and Levanger, and a careful triangulation, with special reference to the requirements of General Baeyer, measurement of a European arc of a parallel was begun. The principal triangulation has been carried on uninterruptedly since that time, Professor Fearnley, of the Christiania Observatory, taking a leading part in it. The altitudes are determined trigonometrically or barometrically, according to circumstances, care being taken to check all observations, and we believe that the northern and southern series have now been connected in a satisfactory manner. The detail survey is carried on by officers of the Topographical Corps, of whom five to fifteen have been employed on that service annually since 1862. These officers have already surveyed 24,390 square miles, the share of each amounting to 210 square miles a year, by no means a despicable achievement, if the difficult nature of the country, and the fact that not only numerous altitudes have to be determined and contours laid down at intervals of 100 feet, be taken into consideration. As Norway has an area of 123,300 square miles, the survey, unless it proceed more rapidly in the future than it has done hitherto, will be completed only in the course of sixty years, which is a long time to wait for a good map of the country.

The results of this survey are being published, since 1869, on a scale of 1 : 100,000.† The topographical map of Norway is a work deserving the attention of topographers. It will consist ultimately of 54 sections of 4 sheets each, but its progress is exceedingly slow, no more than 5 sheets having been published up to the present time. Like other recent publications of the Topographical Office, this map is executed in chromo-lithography. Outline and writing are in black, the surface of fiords, lakes, and mosses, is tinted or shaded in blue, and the hills are in brown. The system of delineating the ground is similar to that described above in connection with the Amt maps. The barren, rocky mountain tracts are shaded in chalk; the more gentle slopes, capable of cultivation, are shaded on Lehmann's system, and the effect produced is more harmonious and satisfactory. At the suggestion of the late Colonel Sydow, contours at intervals of 100 feet will be inserted in future, as has already been done on sheet 14 D.

This map, though so different in style from the copper engraved maps of other countries, is nevertheless one deserving of the highest praise: it is most creditable to the department by which it is issued. Our only regret is that its progress should be so slow.

Amongst maps on a smaller scale, that of Southern Norway, on a scale of 1 : 400,000, occupies the first rank. It will ultimately consist of 19 sheets, of which the two sheets embracing the country to the south of lat. 58° 50′ N. have been published. The map is executed in chromo-lithography (hydrographical features being in blue, buildings in red), and contours at intervals of 500 feet are laid down upon it.‡

* Amt-maps of Norway, published by the Geografiske Opmaaling:
By N. Ramm and G. Munthe:—
Smaalenene, 1 sheet, 1826; Agershuus, 1 sheet, 1827; Hedemarken, 3 sheets, 1829; Jarlsberg and Laurvig, 1 sheet, 1832 (2nd. edition, 1858).
By Gjessing and Andersen:—
Christiania, 3 sheets, 1845; Buskerud, 2 sheets, 1854; Bratsberg, 2 sheets, 1857; Nedenäs and Robygdelaget, 2 sheets, 1858-9; Stavanger, 2 sheets, 1860; Lister and Mandal, 1 sheet, 1862; Sondre Bergenhuus, 2 sheets, 1867 and 1870. Price 2s. a sheet.

† W. Haffner, Kart over Finmarken's Amt. 1:400,000. 2 sheets. Kristiana, 1870. 7s. 6d.

* J. Fries, Ethnografisk Kart over Finmarken. 6 sheets. Kristiania, 1861.

† Geografiske Opmaaling. Topografisk Kart over Kongeriget Norge. 1:100,000. 54 sections of 4 sheets each. Kristiania, since 1869.
The following sheets have been published: 10A, B, D, 14 B, D. Price 1s. each.

‡ Geograf. Opmaaling: Generalkart over det sydlyge Norge. 1:400,000. 18 sheets. Kristiania, since 1869. Sheets 1 and 2 have been published.

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On a still smaller scale, but specially intended to meet the requirements of tourists and travellers generally, is the travelling map of the five Stifter to the south of lat. 65° N.* This map is likewise printed in colours; the water is blue, the cultivated tracts are tinted green, the barren hills grey, and the snow-fields and glaciers are left white. It conveys thus a very striking idea of the physical features of the country, besides which no feature of interest to the tourist, such as inns and post-houses, is omitted.

In addition to these official publications, there are two private road or travelling maps, based upon official sources, and carefully revised from time to time. These are the maps of Munch† and of Waligorski and Wergelander,‡ both of which embrace the whole of the country (Northern Norway being given on a reduced scale). On Munch's map the hills are shaded; Waligorski and Wergelander delineate the ground by means of contours.

We are not as yet able to report on a geological survey of Norway. Professor G. M. Keilhau has, however, published a geological sketch-map of Norway in his *Gaea Norwegica*, a German periodical published by him at Christiania in 1844-50. More recently, Professor Th. Kjerulf, in the Programme of Christiania University for 1870, has published a geological map of Southern Norway, illustrative of a paper on the glacial epoch, whilst to Professor K. Petterson we are indebted for a geological map of Tromsö, to be found in vol. vii. of the *Transactions of the Norwegian Society of Science*.

Our notice of Norwegian cartography could not be considered complete, nor should we have done justice to the *Topografiske Opmaaling*, if we passed by without remark the many beautiful charts published by it. Amongst the names most widely known in connection with Norwegian coast surveys, those of A. Viebe and Schie, the authors of the *Sailing Directions*, are the most prominent. The surveys made by these officers and by their colleagues of the Norwegian Navy, have become widely known through the reproductions issued by the English and French Hydrographic Offices. But these Norwegian officers, not any more than the naval surveyors of other nations, are content to rest upon their well-earned laurels, and new charts, more accurate and detailed than those published previously, are gradually supplanting the older ones. Amongst the more recent publications of this kind there are some charts prepared with special reference to the wants of fishermen, whose avocation plays so important a part in the national economy of Norway. In 1866 the "Storthing" wisely resolved that 1010*l.* a year should be expended upon the survey of the fishing banks lining the coast of Norway, and to the existence of which the country is indebted for so much of its wealth. The surveys carried on since that year are based upon careful triangulations, and the charts resulting from them are amongst the most successful specimens of hydrographic delineation issued. One of them represents the Vest Fiord with the Lofoten Islands,§ the other the coast from the Stadt promontory to Harö, including the Aalesund.‖ Both are on a scale of 1 : 100,000, contain numerous soundings and fathom-lines, and indicate the nature of the ground by means of symbols and tints. Amongst other recent charts, all of which are distinguished by clearness and superior workmanship, we may mention as representative a chart of Christiania Harbour (1 : 20,000), a chart of Christiania Fiord (1 : 50,000), a chart of the Sogne Fiord (1 : 100,000), and a general chart of the coast from Faerder to Utsire (1 : 350,000, 2 sheets).

* Geograf. Opmaaling: Rejsekart over Norge's 5 sydlige Stifter. 1:800,000. 2 sheets, Kristiania, 1869. 2nd. ed., 1870.

† P. A. Munch, Veikart over Norge. Kristiania, 1868. 5s. 6d.

‡ J. Waligorski and N. Wergeland:— Veikart over Norge. 2 sheets. Kristiania, 1st. ed., 1849, others published since.

§ Geogr. Opmaaling: Fiskekart over den indre del af vestfjorden i Lofoten. 1:100,000. 4 sheets. Kristiania, 1869.

‖ Geogr. Opmaaling: Kart over Havbankerne langs den Norske kyst fra Stadt til Harö. 4 sheets. 1:100,000. Kristiania, 1870.

A New Map of Venezuela.

THROUGH the kindness of a friend we have been permitted to inspect a manuscript map of Venezuela, drawn by the Marshal of Trinidad, Mr. Frederick Ralph Hart, F.R.G.S., &c., on a scale of 1 : 1,500,000. The author has embodied in this map much information collected on the spot, and especially during a survey which he made for the purpose of connecting his native Trinidad with Bogota, the capital of Columbia. We trust Mr. Hart may be induced to publish an account of these explorations in a region first rendered famous by the labours of Humboldt. His account of the Orinoco, Apure, and other rivers, which he examined specially with a view to their navigation, would no doubt furnish matter of interest alike to geographers and men of business.

E. G. RAVENSTEIN, F.R.G.S.

New Maps.

EUROPE.

Garnier (A.) Carte Routière du dep. des Vosges, dressée sous le controle dé l'ingenieur en chef du département. Paris, 1874.

Dumas (E.) Carte Géologique du Département du Garde, arrondisement d'Alais. Paris, 1874.

Sallanches et Chamounix. Paris (Dépôt de la Guerre), 1874.

Mongy et Gérard. Plan de la Ville de Lille agrandie. Paris, 1874. 1 sheet.

———. Plan de la Ville de Lille agrandie, de la banlieue et des communes limithrophes. 4 sheets. Paris, 1874.

Messtischblaetter vom Preussischen Staat. (Plane table sections of Prussia, 1 : 25,000). Sections 38 to 40, 50, 51, 52, 53, 54, 55, 56, 67, 68, 69, 70, 71, 72, 82, 83, 97, 98, 112, 113, 114, 115, 116, 117, 127, 128, 129, 130, 131. Berlin, 1874. 1s. each.

Straube (J.) Neuester Plan von Berlin mit nächster Umgebung, Plan of Berlin and environs. Imp. fol. Berlin, 1874. 1s.

Straube (J.) Neuester Plan der Kaiserstadt Berlin. Imp. fol. 1874. 1 : 17,777. Fol. Berlin, 1874. 3s.

Straube (J.) Postkarte von Berlin. (Postal Map of Berlin.) Imp. folio. Berlin, 1874. 6d.

Simencourt, Nuevo Mapa especial de los Caminos de los reynos de Espana y de Portugal. Paris, 1874.

Ilyin (A.) Map of the Railways, Post-routes, Telegraphs and Steamboat tracks of the Russian Empire, 1 : 1,200,000, with map of Asiatic Russia in margin. 2 sheets. St. Petersburg, 1874. 6s. (In Russian).

Ilyin (A.) Orographical Map of Russia in Europe. 1 : 7,350,000. St. Petersburg, 1874. (In Russian).

ASIA.

Tracé d'une excursion dans le Tonquin, par Dufour (Dépôt de la Marine). Paris, 1874.

AMERICA.

Carte de Guadeloupe et Dépendances, par Wuhrer (d'après E. Devèze). Paris, 1874.

Erhard: Great Northern Railways of Columbia. Map showing proposed railways in the States of Cundina, Marca, Boyaca, and Santander. Paris, 1874.

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Log Book.

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"My Parentage and Early Career as a Slave."—The article in our last number with this heading, was entirely written by Selim Agha, formerly a slave, and is the record of his own adventures, which his subsequent education and his natural ability have enabled him to give in this interesting form. We mention this fact, as the *Queen*, in noticing the article, expressed an opinion that it was "manifestly the work of a cultivated European."

Recognition of Mr. Leigh Smith's Services.—We rejoice to hear that this persevering Arctic voyager, who in his voyage of 1873 did such good service in furnishing succour to the Swedish expedition, has had the Order of the Pole Star conferred upon him by His Majesty King Oscar II.

Count Wilczek's Approaching Arctic Trip.—Count Wilczek, the Austrian traveller, is preparing for a second Arctic voyage during the season, to Novaya Zemlya. He is not without hope of discovering some traces of the Austro-Hungarian Expedition of 1872; and with the idea of replenishing their failing stock of provisions, he is having constructed a number of small balloons which will be launched in every likely direction which the good ship 'Tegethoff' may have taken.

Exploration in Iceland.—The exploration of the European Alps does not any longer content the more ambitious members of the Alpine Club, and they are directing their attention to "pastures new." At the last meeting of the Club, which was held on the 5th of May, Mr. W. L. Watts explained his project of exploring the vast volcanic and glacier region of the Vatna Jökull, which occupies an area of 3800 square miles, and rises to a height of more than 6000 feet. Mr. Watts has already spent some time on this Jökull in 1871, when he was accompanied by his friend Mr. John Milne. He proposes now to start with a party of six or eight, and hopes to be able to accomplish his task in the course of three months, and at an expense not exceeding 50*l.* a head. There is no doubt that an expedition such as this would yield results interesting to geographers, and particularly to geologists, for although several attempts have been made to penetrate into this region, no one has succeeded hitherto in reaching the seat of present volcanic activity or of climbing the summit of any of the more prominent hills. Mr. Watts intends to start on the 31st of May, and we wish him success with all our heart.

European Measurement of a Degree.—The surveys in connection with the measurement of a degree have been resumed, in the beginning of May, under the direction of Colonel Ganhal of the Austrian, and General de Vecchi of the Italian Engineers, who are now measuring a base-line in the neighbourhood of Udine, as recommended at the meeting of the Permanent Commission held at Vienna in September last.

Organization of Russian Turkistan.—The administration, or rather mal-administration of Russian Turkistan has been the cause of much anxiety to the Russian Government The governor-general hitherto received a fixed sum annually from the Imperial treasury, which he expended according to his own discretion. He appointed and dismissed officials, and even enjoyed the right of decorating his subordinates. So great and unrestrained were his powers that the title of Polpadishah, conferred upon him by the inhabitants, would appear to be fully deserved. The district governors (Uyest Nachalniks) who served under him, were military men, unacquainted with the language and the customs of the people whom they were to govern, and more intent upon pleasure than duty. General Kaufmann, who is not personally charged with any arbitrary conduct, though he is certainly to blame for not having kept his subordinates under greater restraint, was the first to propose a reform. At his suggestion a commission, presided over by General A. Nenokoichitzky, met at St. Petersburg in the autumn of 1873 for the purpose of elaborating a project for the future government of the Central Asiatic provinces. The report of this commission has now been published. Turkistan will consist in future of the territories or governments of Semirechensk, Syr Daria, and Samarkand; the latter including the districts of Samarkand, Khojend, Kattykurgan, and Penjakend, and the district of Amu Daria, including the Kizil-Kum steppe. A governor-general will be placed at the head of the entire province; the territories will be under a military governor and a civilian vice-governor, and each district under a military district chief (Uyesti Nachalnik). On the staff of each vice-governor there will be a medical inspector, an engineer, an architect, a forester, a mining engineer, and a surveyor. Police boards will be instituted at Samarkand, Tashkend, and Vernoe, and commissioners of police appointed to the other towns. The organization is of a thoroughly military character, and the governor-general will in future be the subordinate of the Minister for War, who will likewise appoint all superior officers and officials. The powers of the governor-general have also been curtailed in some other respects, so as to render them somewhat analogous to those enjoyed by the same class of officials in other parts of the empire. He will, however, retain the privilege of conducting the diplomatic intercourse with the neighbouring states of Asia, of concluding postal contracts, &c. The entire expense of this administrative machinery is estimated at 28,000*l.* a year, exclusive of the cost of the police, the postal service, the collection of revenue, the making of roads, the administration of justice, and of other branches of administration. The governor-general is to enjoy an allowance of 1200*l.*, in addition to his salary; military governors are to have 600*l.* to 720*l.*, civilian vice-governors 180*l.*, and senior officials 100*l.* a year.

The project has been submitted to the Council of the Empire, but does not appear to have met with the favourable reception which its originator anticipated, for it has been referred, in the beginning of May, to the various ministers of State, and the governors of other outlying provinces, and it is anticipated that their reports upon it will turn out adversely. Under these circumstances, General Kaufmann is expected to resign the command which he has held for so many years. For the present, he has been granted three months' leave of absence.

We may mention in connection with this subject

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that the Turkmen, ever since the punishment inflicted upon them by Colonel Ivanof in January last, pay their tribute regularly to the Khan of Khiva, and that that potentate is seriously contemplating to deprive them of the privileges which they enjoyed hitherto above the rest of his subjects.

The Amu Daria Expedition left St. Petersburg for Kazala on the lower Syr Daria on the 5th of May. It is the object of this expedition thoroughly to explore the delta of the Amu Daria, and to ascertain to what extent that river is navigable. For that purpose a steamer of small draught will be placed at the disposal of some of the party, and they will ascend as far as may appear practicable. Colonel Stoletof, who was stationed for some time at Krasnovodsk, and is well experienced in steppe-travelling, will take the command, whilst Severtsof, the well-known explorer of the Thian-Shan, I. Bogdanof, a naturalist who visited Khiva last year, and Major Herbert Wood, of the Royal Engineers, will be amongst the members of his staff. The Grand Duke Nicholas Constantinovich, who was originally intended to take charge of the expedition, has therefore been superseded, it is said, by the St. Petersburg correspondent of the *Allgemeine Zeitung*, because he appropriated some of his mother's diamonds to maintain an extravagant "little French milliner."

Official History of Khiva.—The official history of the Khivan campaign, published by order of the Emperor of Russia, will be compiled by Major-General Trotsky from the writings of the staff-officers and scientific men attached to the different columns. It will be divided into four parts, the first dealing with Russia's movements in Asia down to the year 1873, and giving, in addition, an account of the Khivan Khanate and the routes thither from a strategical point of view, a *resumé* of the causes which led to the expedition being determined on, the plan of the campaign, and an account of the various operations down to the fall of Khiva. The second part will deal with the occupation of the town up to the preparations for the departure of the Russian troops. The third part, besides relating the return of the forces, will contain a mass of valuable suggestions and information on the subject of steppe campaigns in general, while the fourth part will be entirely scientific, and reserved for a detailed account of the geographical, meteorological, zoological, botanical, geological, and other labours achieved by the various members of the expedition. The work will be illustrated by maps, route surveys, sketches, and detailed reports on special points of interest.

Asiatic Society of Japan.—The first part of the *Transactions* of this Society, which met for the first time at Yokohama on the 8th of October 1873, and already numbers 109 resident members, contains several papers interesting to geographers. To this class belong Mr. Satow's notes on the "Geography of Japan" and the "Loochoo Islands," Mr. W. G. Aston's account of Russian descents on Saghalien and Jtorup in 1806 and 1807, and Professor W. E. Griffis's paper on "The Streets and Street-names of Yedo."

Dr. Burmeister, who is favourably known on account of his contributions to the physical geography of the Argentina, has been appointed President of the Faculty of Natural Science at the University of Cordova.

Great discoveries of Guano on the Peruvian Coast.—A most important discovery has been made on the coast of Peru. The existence of a large deposit of guano, hitherto unknown, is confirmed. It lies principally on the point called Pabellon de Pica, ten miles north of the river Loa, which forms the boundary between Peru and Bolivia. Here the engineers, sent down by the Peruvian Government, have found 5,000,000 cubic metres of guano, which could be shipped by the construction of a tramway not more than 1300 yards in length. The anchorage is excellent. At Huanillas and Punta de Lobos, further to the north, 3,000,000 more cubic metres were found. Captain Cookson, of H.M S. 'Petrel', has also gone carefully over the ground at Pabellon de Pica, and fully confirms the report of the engineers. Another commission is about to be sent to make a final survey. These 8,000,000 cubic metres of guano represent a sum equal to 52,000,000*l.*, which fare xceeds the amount of the public debt of Peru.

Exploration of the Aleutian Islands.—Since M. Pinart's* travels in the Aleutians, Mr. W. H. Dall, of the United States Survey, has been spending six months in exploring the islands. A new fore-and-aft schooner named 'Yukon,' of about 100 tons register, was placed at his disposal by the superintendent of the Coast Survey, and in this vessel he visited most of the principal islands, observed for latitude and magnetic declination, took the height of the chief peaks, and carried a series of deep-sea soundings northwards of the Aleutians. These last brought to light a new fact, *i.e.* that the shallow basin of Behring's Sea, by the north-west point of Oonalaska, dips suddenly down from a depth of 60 fathoms to 800 fathoms, while further to the north-west the bottom slopes down to 1100 fathoms. The theory of a current flowing round Behring's Sea in a circular direction has no foundation, according to Mr. Dall. Between Unimak and Bogoslof Islands he found 800 fathoms average depth, a fact which M. Pinart bears out by his description of the tremendous sea and continuous southerly current here prevalent.

Mr. Dall has also paid attention to natural history, and finds no blending of the American and Asiatic types, but in every respect a gradual approximation to the Arctic ones. The *fauna* of Attu, for instance, is purely Arctic. The sea temperature, too, is colder to the east than to the west of the Aleutians, which fact indicates a southerly current from Behring's Strait.

Mr. Dall intends to start again for these islands, from San Francisco, some time this spring, and to return at the latest about the spring of next year.

A Roman Catholic Mission on the Loango Coast.—In September 1872, a Roman Catholic Mission was founded at Landana, about 45 miles north of the mouth of the Congo, by Père Duparquet. The site was exceedingly pretty, the climate healthy, and several European factories have sprung up there, while palms, maize, and cassava have been largely planted and thrive most satisfactorily. The parasitical insects which infest so many parts of the African coasts are happily unknown, and the negroes being free from ailments common in other parts of the continent, are of good stature, active, intelligent, and make capital workmen.

* *Ocean Highways*, March, 1874, p. 520.

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For the modest sum of 32*l.* Père Duparquet has purchased the freehold of a small valley about a kilometer square. There are several springs in it, and the mountain slopes are covered with rich pasturages and luxurious forests. Here he has started a school of agriculture, somewhat similar to those situated at the Gaboon, at Senegal, and at Zanzibar, and in October last was honoured with no less than sixteen pupils, nearly all sons of native chiefs! Communications with Europe are regular; and as there is a river hard by which admits of easy communication with the interior, there is good ground for anticipating a prosperous and speedy development of this young colony.

An Italian "Lloyd's."—Our readers are well aware of the increased importance which Brindisi, and more indirectly, the whole of Italy have derived from the opening of the Suez Canal. In February 1872, a committee was formed in Milan with the object of founding an Italian Maritime Company, and 20,000 francs were subscribed towards preliminary expenses. Camperio, Orlando, and other well-known names were associated with the project, and a congress at Rome was fixed upon, but, unfortunately, the matter has made no further progress. Italians do not seem to realise that they should abandon their position as mere brokers and navigators within the limits of the Mediterranean, and traverse the ocean, and thus take a share in the commerce of the world. For instance, to China, which, in 1871, was visited at its fourteen treaty-ports by no less than 11,124 ships bearing the British and American flags, there did not sail a single Italian merchantman! Italy with its 3350 miles of seaboard, its 18,000 vessels, and a marine of about 100,000 men, has exceptionally favourable opportunities for organizing a prosperous foreign trade.

The Milan Committee has published a *brochure* entitled *Messaggerie Marittima Italiane. Proposta d'una Società di Navigazione generale a vapore*, in which the above arguments are ably brought forward and forcibly urged. They also draw special attention to four trade-routes which offer exceptional commercial advantages, viz., those to the East Indies, China and Japan, to Turkey and Greece, to New York, and lastly to La Plata. The capital required is 50,000,000 francs. It is greatly to be hoped that, though the Government unfortunately is in no position to offer a helping hand, there may be sufficient private enterprise in Italy to bring to maturity so excellent and all-important an undertaking.

Piracy on the Coasts of Darien and Chocó.—It is reported, in the *Panama Star*, that a party of lawless men have been cruising for some time back in a small schooner along the unfrequented parts of the Coasts of Darien and Chocó, South of Port Pina. While an American by the name of Newcomb was repairing his vessel on the beach of a little bay, into which the river Coredo falls, some 10 or 12 miles to the north of point Marzo, this said schooner came in and anchored. Shortly after, a party of six or eight men, armed with rifles, came to where Mr. Newcomb was, and demanded his money or his life. He gave up to them $500, which they took, and ordered him as soon as his vessel floated to clear out and leave the bay. Mr. Newcomb did so, and returned to Port Pinas, where he has a house, and is engaged in the Caucho trade. There happened to be anchored not far from him in the bay of Coredo another vessel, belonging to a man in Panama, by name P. Blanco, who was also robbed by the same party of $650. Sworn depositions by witnesses of these acts of piracy have just been taken before the United States Consul in Panama. Both Newcomb and Blanco believe this piratical expedition was fitted out in Buenaventura, a port on the coast of New Granada.

Obituary.—Professor PHILLIPS died on the 25th of April from the effects of a fall down the stairs of All Souls' College, Oxford, aged 73 years and 4 months. Ever since 1826 he has been one of the most indefatigable contributors to the literature of geology, his latest works being a *History of Vesuvius*, and a *Treatise on the Geology of the Thames Valley*. He was the inventor of a pluviameter, of a self-discharging electrophorus, and of a peculiar maximum thermometer; and with General Sabine and others took part in a magnetical survey of the British Isles.

We purpose giving in our next number a memoir of this eminent scientific man.

Dr. BERGSTRAESSER, Russian Councillor of State, died on 19th of last April, at Tamar. He had done much to develop the exploration of the naphtha springs in the Caucasian provinces, but is best known to geographers in connection with the proposed canal between the Black Sea and the Caspian. The deceased was a member of the commission appointed to carry out the liberation of the serfs, and the author of several works on political economy.

Dr. RICHARD BRENNER, late Austrian Consul at Zanzibar, died at that place on the 22nd of March, from acute disease of the lungs, leaving a young widow and an only child to deplore his loss. Dr. Brenner was a native of Merseburg. He accompanied Baron von der Decken during a portion of his East African wanderings, and was one of the few survivors who escaped the Baron's fate on the Juba. Subsequently the deceased visited the coasts of Arabia, the Gulf of Persia, and Eastern Africa, and penetrated, in 1866-67, for some distance into the Somal and Galla countries. A copy of James Wainwright's diary was given to Dr. Brenner ten days before he died, and has been forwarded to Dr. Petermann for publication in the geographical *Mittheilungen*.

Baron HEINRICH VON MALTZAN died on the 22nd of February at Pisa, at the early age of 48. He enjoyed a high reputation as a traveller and Orientalist. Amongst the works published by him are—*Three Years in North-Western Africa*, *A Pilgrimage to Mekka*, *Travels in Tunis and Tripoli*, and others. We are likewise indebted to him for the publication of Wrede's most valuable diary, kept during a journey into Hadramaut, and for a work on South-Western Arabia, which is crammed full with geographical facts. The deceased was a frequent contributor to *Petermann's Mittheilungen*, to the *Journal of the German Oriental Society*, and the *Allgemeine Zeitung*.

The Rev. FRANCIS MASON, D.D., born at York, in 1799, and for many years a Missionary of the Unitarian Baptist Society, died lately, after returning from Bhamo, in Upper Burma, aged 75. He was the author of a Karen grammar, and of a work on Tenasserim, published in 1852. At the time of his death he was occupied upon a *Handbook for Burma*.

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Correspondence.

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To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In the *Geographical Magazine* for May (which has reached me late) there is a report of an interesting paper by Mr. Ashton Dilke on the Valley of the Ili. In speaking of the lake called Issik Kul, and certain theories about it, he says this lake "as we know from Chinese records, was formed by some convulsion of nature about 150 years back." I should have supposed 150 to be a misprint, but a friend who was present at the Society's meeting, gave me the same account. Now Abulgházi, historian and king, says that Turk, the son of Japhet, dwelt on the banks of Issik Kul, which carries us a good bit further back than 150 years, and if not back to Japhet, at least as far back as Abulgházi himself, who died 211 years ago. Moreover, on the famous Catalan Map in the great French Library, dating from 1375 or thereabouts, we find very fairly located lake Yssikol, with a rubric stating that there was an Armenian convent theron, which contained the body of St. Matthew. Here again we need not swear to the body of the Apostle, but we may (if need be) that lake Issik Kul existed more than 500 years ago. Furthermore, the Chinese Pilgrim Hwen T'sang, in A.D. 629, travelling N.W. from Polukia or Aksu, crosses "an Ice-mountain" in connection with the Tsung-ling (viz., the *Múz-tágh*), and descends upon a great lake which he calls T'sing-chi. This lake was about 1000 *li**—say 200 miles—in circuit; was long from E. to W., and narrow from N. to S.; was surrounded on all sides by mountains; had salt and bitter water; abounded in fish; and also contained dragons, &c., &c. We need not perhaps believe in the dragons, but we must believe that the lake, which can only be Issik Kul, existed 1245 years ago. I cannot *prove* its existence any further back.—Your's very faithfully,

H. YULE, *Colonel.*

PALERMO, *May 16th*, 1874.

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M. KHANIKOFF ON FRASER'S TRAVELS IN KHORASÁN.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Some eighteen months since you were good enough to give me space in *Ocean Highways* for following Colonel Yule in the exposure of errors and misstatements into which the illustrious Russian traveller M. Khanikoff has been led by unworthy jealousy of his English predecessors in the field of Central Asian Travel.

Study of every work bearing on the geography of Persia in the course of preparing a map of that country for the India Office, has brought to my knowledge another instance of M. Khanikoff's want of candour, to use no harsher expression, in criticising the work of an Englishman, which will be blamed by all who hold that "science has no country." You will not, I feel sure, grudge me a few lines to place before English geographers the admirable results obtained by a fellow countryman with the slenderest means, and to exhibit in their true light scientific achievements slurred over or damned with faint praise by a successor in the same path, in order to exalt the performances of himself and another Russian explorer, M. Lemm.

M. Khanikoff devotes the first part of his work *Sur la partie meridionale de l'Asie Centrale*, to an account of earlier travellers in Eastern Persia. Pages 28 to 32 contain an account of the journeys of Fraser in 1821-22. After describing Fraser's route in general terms, and mentioning the instruments he took with him, he says, "Il mit beaucoup d'assiduité à faire des observations astronomiques, mais comme il ne les a jamais publiés en detail, nous ne pouvons les juger que par les resultats qu'il a donnés." What more does M. Khanikoff want? Surely he must know that details are no proof of good faith, and that it is as easy to calculate the altitude of a heavenly body from a given place and time, as to find the latitude or longitude from the altitude. To Englishmen it would seem that elaborate volumes of mere logarithmic calculations, such as are published by the Russian Government, are but a vulgar parade of scientific accuracy, or, at best, useful only as examples in works of practical astronomy. Be this as it may, Fraser was first in the field as a determiner of longitudes in Eastern Persia, and his results are therefore sufficient to judge him by.

After giving the number of points fixed by Fraser, and the methods he adopted, M. Khanikoff points out discrepancies in the results obtained in two places, Damghán and Níshapúr, by his chronometric and lunar observations, and those of Jupiter's satellites, in the following terms. "La difference de 46 minutes pour le premier point et de 10 minutes pour le second ne donne pas une très haute idée de l'exactitude des observations elles mêmes (the eclipse and chronometric longitudes of Níshapúr are but 1' 37" apart, and their accuracy is confirmed by Lemm), et dans tous les cas cette discordance justifie la prudence avec laquelle M. Arrowsmith a modifié plus on moins les co-ordonnés geographiques de quelques points determinés astronomiquement par M. Fraser, d'après l'indication des distances evalués par le voyageur, et les angles qu'il a mesurés à l'aide de la boussole." Not a word about the longitude of the three principal cities fixed by Fraser, Tehran, Meshed, and Isfahan. Indeed the whole passage would lead the reader to suppose that the instances given are fair examples of Fraser's work, that his astronomical observations are of no great value, and that much, if not most, of the merit of his map is due to Mr. Arrowsmith. I do not wish for a moment to depreciate the services of that eminent cartographer, but simply to render justice to Fraser, the measure of whose capabilities as an observer, can readily be seen from the following table of longitudes of the three places mentioned above:—

Longitudes.	By telegraph.	Fraser.	Lemm.	Khanikoff.
Tehran	51° 24′ 54″	51° 22′ 30″	51° 27′ 24″	follows Lemm
Isfahan	51° 39′	51° 42′ 30″	...	51° 45′ 45″
Meshed	...	59° 35′ 27″	59° 38′ 45″	59° 37′

A glance at this will show that Fraser, with his imperfect instruments, and the powers of observation of which M. Khanikoff has not a "haute idée," fixed the longitude of Teheran as near the truth as Lemm, the pupil of the great Struve, to whose really admirable work several pages are devoted by M. Khanikoff; and that he got nearer the longitude of Isfahan by 3 miles than M. Khanikoff himself, with a trained staff and all the appliances he considers so necessary. At Meshed the two Russians did nothing more than confirm the great accuracy of the result obtained by the Englishmen. To omit all mention of this remarkable achievement was neither just nor generous, and I cannot but believe that Englishmen chronicling the scientific results of their expedition, following, after many years, the track of a solitary Russian traveller, would not have been eager to award to their predecessor a full measure of praise wherever his observations were corroborated by their own, instead of passing them over in silence, and to fix on minor and comparatively unimportant points of discrepancy for the purpose of withdrawing attention from the foreigner's work to their own.—Yours, &c.,

O. ST. JOHN.

* So in the *Mémoires sur les Contrées Occidentales*, I., p. 11; in the *Vie et Voyages de H. T.*, p. 54, the circuit is 1400 or 1500 *li*.

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Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

May 10th, 1874.

THE Right Hon. Sir H. BARTLE FRERE, K.C.B., took the chair at 8.30 P.M. Among those present were the Duke of Sutherland, Sir Garnet Wolseley, Sir John Glover, Sir Francis Festing, Captain Sartorius, Captain A. H. Hoskins, R.N., Captain Fremantle, R.N., Captain A. H. Markham, R.N., Colonel Fairfax, Major Wilson, R.E., Captain Home, R.A., &c.

The PRESIDENT said he had hoped before this to have been able to lay before them some details of the Australian explorations of Colonel Egerton Warburton, but beyond the bare fact that he and the members of his party had arrived in safety at the end of their journey, there was as yet little to communicate. He would now call upon Captain Sir John Glover to give the results of some of his explorations upon the Gold Coast, with which he was so well acquainted.

Sir JOHN GLOVER then gave an account of his expedition from the Volta to Coomassie. He said that their first and most persistent enemies, on arriving at Accra, were the slave-masters. After the expedition had crossed the Prah, instead of assisting the troops by their slaves to fight their battle, they immediately proceeded to put all their slaves in chains to prevent their joining the Queen's forces. He described the country after leaving Adoomassy as covered with forests. Three ranges of mountains had to be crossed, but the great difficulty in following the narrow path was to keep from falling down the gold pits which were dug on either side of the road. The natives had only an idea of sinking a shaft, and never tunnelled underneath. He believed that with scientific appliances a great quantity of gold could be still found there. The mountains were entirely composed of quartz and granite, while the rivers over which they passed were all dammed up for the purpose of washing gold. Ten miles inland from Accra, the mountains of Acropong attained an altitude of 1600 feet, and from there, until they reached the river Amoor, the line of march was over a country marked by the gold shafts he had described. He described the natives as a very idle race; so idle that he did not think they would interfere with any one enterprising enough to go out and dig the gold on their own farms. The Beren River was said to be very rich in gold. After the floods large boulders were washed down, and being split open by the force of the current, the natives went down when the river was low and secured very large quantities of the precious metal. He remarked on the entire absence of animal life in those regions: they met with neither antelope nor leopard, and no birds except a few parrots, which sometimes screamed from the tops of the trees. The only living beings with which they were troubled were ants and snakes. After taking Abogoo they succeeded in surprising and capturing some 200 sheep. When the country was opened up to commerce by the recent victory, he was sure that a large amount of territory between the Upper Volta, Timbuctoo and the Niger would be brought within the sphere of civilization. The entire country east of Coomassie to the Volta had given in its adhesion to the British Government, and refused allegiance to the King of Ashanti. Therefore, whatever might be the King's objection to keeping the treaty, his power was gone, and the results to civilization would be manifest. The country running up towards the Niger was large, open prairie land, with clumps of trees and tall grass. It was a country in which all kinds of animals live: a bullock at Saga cost 4*s*. 6*d*., a sheep 6*d*., and fowls about 1*d*. each. It was inhabited by Muhammadan tribes whose great power was in their cavalry, and no doubt now that the power of King Coffee was broken, these enterprising men would press down to the sea-coast to taste the sweets of what they called the white man's trade. He was almost afraid to tell the company present, which included so many ladies, that he had been compelled to be so ungallant as to press the women of the country into the service as carriers; but were he to go out again he should certainly recommend the Government to raise a force of women and arm them, and leave the men at home. After speaking in high terms of the work done by the German missionaries at Accra and the inland towns, Sir John Glover expressed his willingness to answer any inquiries that might be made of him to the best of his ability with regard to the nature and resources of that country.

Sir GARNET WOLSELEY having been called upon to speak, confirmed the account given by Captain Glover. The principal food of the inhabitants was a large species of snail, which was toasted. He saw neither fowl nor sheep in the district through which he passed. He described the march to Coomassie as being under a tunnel of trees, and though at first the foliage seemed very beautiful and the trees very grand, it soon palled upon the eye. He believed the effect of the expedition would be to open the country to commerce and civilization. When he arrived at the coast, the name of England was at the lowest in that part of Africa, but he believed nothing could stand higher now, and that the prestige of England's name would make the work of exploring the interior easy for a long time to come. He saw no gold mines, but the old women at Cape Coast Castle were in the habit of washing for gold in the gutters in the streets after a shower of rain. As they seemed to have been engaged in that employment from time immemorial, he supposed they were able to obtain a sufficient amount of gold to support them for the day. As to their religion it was difficult to say what it was, for they seemed to worship sticks or stones, or anything which took their fancy, even if it was a pair of old boots. They had an idea of some kind of deity, but it was a bad deity rather than a good one. There appeared to be some connection between Western and Eastern Africa, for the Accra bead found in the neighbourhood of Lake Chad, was evidently of Egyptian construction. He said that if the result of the expedition was the abolition of human sacrifices, it would not have been undertaken in vain. He believed the only way of stopping the internal slave trade would be the entire prohibition of the importation of arms and ammunition to the West Coast of Africa.

Captain FREMANTLE then gave his impressions of the Fanti and Ashanti country. He endorsed what had been said as to the entire absence of animal life, which his experience taught him was, like human life, extremely scarce where the bush was thick. The trade of the country consisted in the importation of arms, ammunition, rum, tobacco, and cloth, in exchange for which gold dust was given. The Ashanti was entirely non-productive; the Fanti was somewhat better, and he believed that if the Ashantis were subdued the first step in their advance would be to make them Fantis. Their language was the same, though the dialect might be slightly different. With regard to the alleged greater cowardice of the Fantis than of the Ashantis, he said they had not been behind the scenes with the one as they had with the other.

The Rev. W. HUTCHINSON having expressed the pleasure with which he heard the German mission at Accra so highly spoken of,

The CHAIRMAN expressed the thanks of the Society to the officers who had favoured the Society with their presence on that occasion.

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AMERICAN GEOGRAPHICAL SOCIETY.

LETTERS FROM THE OFFICERS OF THE 'POLARIS.'

I.

From Captain Buddington.

GROTON, *February 20th*, 1874.

As there has been a great deal said about the voyage of the 'Polaris,' I consider it my duty to make a straightforward statement. Not wishing to build myself up by tearing some one else down (as is too often the case), every statement I make here I will prove by the majority and best of the officers and crew. And I wish to state here I never sailed with better officers and crew, during twenty-one years as master of a ship; I refer to mate, second mate, engineers, seamen, firemen, cook, and steward. After leaving Upernavik, we passed Melvin's Bay, Smith's Sound, and Kennedy Channel, with little or no obstruction from ice. After passing through Kennedy Channel we went into what we called Hall's Basin; we passed through that and came into a channel which Captain Hall named Robeson's Channel; proceeded up to lat. 82° 16' where we met with heavy ice, all old heavy floes. Captain Hall designated them century floes. This strait was running true N.N.E.; we had 104° westerly variation, at 4 o'clock, a.m., August 29th, 1871. We came to a full stop at this barrier making from one shore to the other; these straits were about 15 miles wide. The weather being cloudy, could get no observation; the ice in the middle of the straits was setting south, about 2 miles an hour. As there was no chance of getting farther north, Captain Hall told me to go on the east side of the straits and look for a harbour. When within about a mile of the shore we found the tide running very strong to the southward; the heavy floes going along the shore at the rate of about 4 miles an hour. Captain Hall and Captain Tyson endeavoured to land twice, but owing to the strong tide and heavy ice, found it impossible to do so. As it was impossible to proceed farther north, Captain Hall held a consultation with the officers and scientific gentlemen; the result I will give you in their own words:—Dr. Bessels was the first consulted; his opinion was, if we could get no farther north, to cross the straits and winter on the west side, as the east side was better for navigation; the west was better for sledge journeys. Mr. Myers was then consulted and coincided with Dr. Bessel; Mr. Morton's opinion was the same, or nearly so; Captain Tyson's, to get into a harbour as soon as possible; Mr. Chester's, to get as far north as possible, as every mile we got north with the ship would save so much sledging. I was then asked my opinion. I said it was best to go into Newman's Bay, which was 5 or 6 miles south of us, and hold on until there was an opening for us to the north, as the ice was setting south and we were losing ground every minute; but Captain Hall decided to try and cross the straits to the west, if possible; if not, to return into Newman's Bay. In trying to cross the straits we got beset among the heavy floes and drifted 50 miles to the south. We got one very heavy nip, and landed a part of our provisions and stores on the ice. The ice slacked up, and we finally got clear the afternoon of September 4th, and worked in-shore on the east side of Hall's Basin, where we came to anchor between the shore and a large grounded berg in what is now called Polaris Bay, in 10 fathoms of water. The next day, Captain Hall went on top of a mountain to take a look at Robeson's Channel. When he came back he told me to land the provisions and prepare for winter, as he had decided it would be impossible to proceed further that year. On the 10th of October, he made a sledge journey to Newman's Bay. Robeson's Channel was still blocked with ice, moving south, which I think was convincing proof that there was no water near us to the north. If there had been, we being anchored, the ice would have passed us, and we should have soon been in open water. As long as we had light the ice was moving south in the channel, and as soon as we had light in the spring, it was still moving the same. On the 24th of October, in the afternoon, Captain Hall returned to the ship from his sledge journey to Newman's Bay, and spoke very highly of it as a winter harbour, and wished we had been there. He was taken sick the same afternoon, and died on the 8th of November, and was buried on the 10th. Every man (especially seamen) knows what it is to lose a commander on the beginning of a long voyage: the subordinate who is so unfortunate as to try to fill his position has a great many obstacles to surmount, especially where so many are on an equality as on board the 'Polaris.' It matters but little what his qualifications may be, he cannot command nor demand the respect that the commander has who sails in command from home. I found it impossible to keep up the same discipline, or the same kind of discipline that Captain Hall had. The duty of the ship was strictly attended to; the amusement of the men was somewhat different. They took a great interest in hunting and dog driving; and as I knew that pleasure combined with exercise was the only thing for health in that country, I indulged them in that luxury. I think it was owing to this we had not a sick man during the winter. A sailor with a gun or a horse is a very busy, but not a profitable man. In the spring of 1872 I used every means in my power with ship, boats, and sledges, to proceed north, but failed in every attempt, and finally, on the 12th of August, with the ship leaking badly, and our coal nearly exhausted, I made up my mind to return home. As to the accusations concerning Captain Hall's death, deserting the party on the ice intentionally, or habitual drunkenness, I think them too ridiculous to mention; as I consider a person who would be guilty of such things would surely deny them.—Very respectfully yours.

J. O. BUDDINGTON.

II.

From Captain Tyson.

SIR,—In compliance with your request that I should give you my views upon the hydrography of Smith's Sound and the waters connecting with it to the northward—and especially as to the correctness of some of the views advanced before the Geographical Society, on the occasion of its late "Reception to the officers and crew of the late 'Polaris' Expedition," I here briefly set down my ideas upon the subject. On the occasion referred to, Captain Buddington gave it as his opinion "that it was impossible to get through Robeson's Channel," adding that he "saw no signs of water to the northward." Now, Captain Buddington has seen ice before, but on this occasion seemed to have taken counsel of his fears, rather than a correct observation of the facts in the case. Then followed Mr. Bryan, the astronomer and chaplain to the expedition, who was just seven days old in the Arctic world when called into counsel by Captain Hall; and with all due respect to our young scientific friend, who thinks that "the ship was never built, or if built never manned, that could penetrate the ice" north of 82° 16', it must be remembered that he was not appointed on the expedition as a Polar expert, but to take observations on the stars, and if possible to reach beyond, to the heavenly gates, in his *role* of chaplain; but even he did not say but that a dark water cloud could be distinctly seen, and apparently close to us, at our highest latitude north. But first, to settle the question as to the ice-pack in Smith's Sound. Captain Buddington declared that he "could see no water there," and was for turning back and putting into Port Foulk. The pack-ice on the 28th of August, 1871, was very heavy and compact, but there was water close under the west shore, and during my watch on deck, I rounded or flanked that pack, by sailing first to the S.S.W., and made the west shore at 2 o'clock A.M. rounding the western edge of the pack at 4 o'clock A.M. I then went below—the 'Polaris' had then been steaming direct up the land for two hours. At 6·30 A.M.

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Captain Buddington sent the Steward (Heron) to call me. I went on deck. Captain Hall was then about half way to the shore in one of the boats—the vessel being abreast of Cape Frazer, and about half a mile from the shore. On coming on deck I asked Captain Buddington what Captain Hall was going on shore for. He replied "to look for a harbour; we cannot get any farther north, there is no water ahead;" but upon my plainly showing him his error, he said, "Well, we must not go any further, we have got too far now; if we go any further north we will never get back." Now if we had turned back at this point, Messrs. Buddington and Bryan would undoubtedly have said that the 'Polaris' had gone as far as it was possible to go, and that "the ship was never built, or if built never manned," that could have penetrated the ice of Smith's Sound! Captain Hall soon returned, very fortunately finding no harbour, and the vessel was again pointed northward, steaming through close and heavy floes off of, and to the north of Cape Frazer, coming in a few hours to comparatively clear water; and for 150 miles there was scarcely any ice to be seen, nor indeed until we came to Robeson's Channel. The snow had at that time entirely disappeared from the land, nor was there any shore-ice adhering to the coast; indeed, all that was needed to give the scenery the aspect of the temperate zone was a few trees. But here was a new channel—new at least to the knowledge of the civilized world—blocked with large, heavy floes. Robeson's Channel is about 18 or 20 miles wide, and I think from 30 to 35 miles through. Here we found the ice very close and heavy; it was also very much discoloured with earth and mixed with stones, which showed that these floes had been formed on the plateaux further north, and had drifted down to their present position during the summer, and had thus blocked up the channel. This obstruction, however, was merely temporary—all that was needed was a strong blow from the N. or N.E. to clear the blockade, by driving this ice to the southward, thus leaving this channel navigable. Captain Hall, finding it impossible just then to get the vessel through on the east side, called a consultation of officers. There were present Captain Buddington, Chester, Morton, Dr. Bessels, Myers, and myself. Buddington wished to return south to the bay, since known as Newman's, and there spend the winter. I told Captain Hall that he should try and find a safe harbour at once for the vessel, where he could, without risking the 'Polaris,' lie by and watch for the movement of the ice in Robeson's Channel, and where he might be able to take advantage of an opening; for I felt convinced that the first strong wind would clear the channel and give us the opportunity to get further north. But the majority were in favour of trying the west shore, wishing to see if the vessel could not be forced through on that side. So to the westward the 'Polaris' steamed; and in a few hours we were among the large heavy floes—and yet all this time there was the dark water cloud but a short distance to the north of us. Occasionally a damp, black fog would roll down upon the vessel, with the light N.E. wind which then prevailed. I also saw here a great deal of ice, which looked as if it had been washed by the sea; the vessel's head, too, rose and fell with the swell as we approached Robeson's Channel. But here we were, locked in among the floes, with water both to the north and south—Kane's "open Polar sea" to the south, and the unknown world and waters to the north, with but a few miles of ice lying between the 'Polaris' and the unsolved mysteries beyond. Soon the N.E. wind, which had been very moderate, increased to a gale, and, as I had anticipated, the ice in Robeson's Channel commenced moving southward at about 2 miles an hour, and away we went with it, until the ice reached the opening of Polaris Bay, when it broke and spread, and the vessel was free once more. Now then the vessel could have steamed through the channel—now was the time; delay was ruin, for the season was then drawing to its close; but winter was approaching, a few days remained yet in which we might have navigated those seas, and with steam have accomplished—we know not how much more. But instead of improving this opportunity, which Providence fairly thrust in our faces, we steamed for a little bay south of Cape Lupton, since called Thank God Harbour. There we found good anchorage in 11 fathoms of water having a mud bottom. We had, however, at this anchorage no other protection than such as the grounded hummocks afforded, and that was very little. It was about 3 o'clock A.M. on the 1st or 2nd of September when we made this harbour. About 8 o'clock A.M. Captain Hall held another consultation with Chester and myself, Captain Buddington standing by. As there was plenty of water our decision was to go northward again, but this decision was overruled—the sailing-master, Captain Buddington, declaring "she should not move from there." It would have taken the 'Polaris' but a few hours to have steamed entirely through Robeson's Channel, supposing the ice to have been cleared out as I have no doubt it was at that time. A few days after anchoring we had our first snow-storm, the snow falling amid the hummocks, lay for some days soft and plush-like, but gradually hardened so that we could walk upon it. But for many days, indeed, until we lost the light, there was plenty of water within a few hundred yards of the vessel. In the latter part of November, in a very heavy N.E. gale, our little 'Polaris' broke out of her winter quarters. We had no day-light then, so we could not see how much water surrounded us, but the vessel was in considerable motion, rising and falling several feet to the swell. North-east winds prevailed during the winter, often blowing with great violence; the gales continuing sometimes for five or six consecutive days. These N.E. gales would drive the ice all southward—then new ice would again form, only to be driven away by the next gale. In February, although the sun's disc had not appeared above the horizon, yet our light was quite good. At mid-day you could see as well as though the sun had been shining; and after one of those fierce north-east gales, I climbed to the top of Cape Lupton (about 1800 feet), and from that elevation I could see no ice; the gales had driven it all southward. To the north the horizon looked dark and watery. Even the ice along the shores had disappeared—none remained, except the ice grounded among the shoals running from Cape Lupton to the Southern Fiord. In March the ice became permanent; the north-east gales had no effect on it any more, until the month of May, when it was once more in motion, drifting first south, then north, crushing and grinding itself into its original element, water. There is great significance in the tides to those who can understand them. In strong southerly gales the tides were invariably higher than at any other time, and while the gale continued in this direction there would be but a very slight fall, while during the prevalence of north-east gales the tides did not rise near so high; and in the long, heavy gales from the north, very low tides were observed and very little rise. Mr. Bryan, as confirming his hypothesis of the impossibility of getting farther northward, said that "in the spring they made several attempts to get north with the vessel" (while I was up at Newman's Bay). This proves nothing, even if the attempts made had been genuine efforts, for the only proper time to navigate these waters is the last part of August. On the 30th of August, 1871, there was an opportunity to get north through Robeson's Channel. In June, 1872, Buddington made some feints to get north, but he had said plainly to me before, that he did not wish to go any further north, and these purposeless endeavours were meant simply to impress the inexperienced on board that he had done his whole duty. In fact, the 'Polaris' had been so badly handled through the winter, that she was not in a condition to continue her voyage with any prospect of success—providing the provisions and coal had been sufficient, which

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they were not, on account of the great waste which had been permitted through the winter, after Captain Hall's death. In regard to the expedition of the two boats which started for the northward in June, 1872, they were too frail—only half-inch cedar planking—to contend with Arctic ice. The month of June, too, is one of the worst seasons for boat journeying in the far north, for then the broken ice is most plentiful—then, the Arctic seas, fiords, and bays are breaking up, and emptying themselves into the straits and channels; wind and current helping to force these floes and hummocks to the south. The attempts, therefore, to get the 'Polaris' northward at that time were simply folly—exploiting for the purpose above named. Of the two boat parties, all the men lived to return; but of the boats neither, one was lost almost as soon as launched, and the two others had to be abandoned 20 miles from the ship; the officers and crews walking back over land. You will ask—Why did not an exploring expedition go by land? Those who were willing to go could not get the authority or proper means to go with. There were excellent opportunities to accomplish something by land travel. We had plenty of good dogs, and two good Esquimaux drivers—one of them (Joe) even wanted to go, but beyond 31 miles north of where the ship lay, nothing was known—that distance Mr. Myers and myself travelled on a musk-ox hunt, up to latitude 82° 9′ N.; beyond that the foot of white man has never trodden.—Respectfully yours,

GEO. E. TYSON.

Late Assistant Navigator to 'Polaris' Expedition.

III.

From Captain Chester.

NOANK, *February 20th*, 1874.

SIR,—To comply with your wish, I write you a short and truthful narrative of the progress of the 'Polaris,' of the late North Pole Expedition, after leaving Tessuisak, the most northern settlement on Greenland. Leaving Tessuisak, on the afternoon of the 23rd of August, 1871, a dense fog prevailing, we steamed along to the north about half speed, feeling our way through the fog, passing occasionally near large icebergs. We were enveloped in a dense fog till meridian of the 24th. I mention this to show that there were twenty-four hours steaming a little better than half speed. On the clearing up of the fog thousands of icebergs were in sight. Looking to the north from our vessel, the icebergs were so numerous that they presented an impenetrable wall of ice, no opening to be seen through them; but as we advanced up, we wormed the 'Polaris' through between them till we came out to the north. At about seven o'clock in the afternoon of the 24th, we came up to pack-ice, but it was so open that we had no difficulty in steaming through it. A few hours' steaming cleared us of this ice, and we came out into a clear open sea of water beyond. Cape York was now in sight, and we were making the best of our way towards it. There was no ice to be seen to the north at this time. On the morning of the 25th we came up to pack-ice near Cape York, and were obliged to steam off to the west a number of miles, where the pack loosened; we again steaming to the north. At about six o'clock in the afternoon of this day we passed through between Wolstenholme and Saunders Island. We continued to encounter loose drifting ice up to about ten o'clock on the morning of the 26th, when we were in clear water again. Not a speck of ice to be seen to the north, with the exception of two or three small ice-bergs. We passed up through Smith's Straits, no pack-ice to be seen. About five o'clock in the afternoon of the 26th, we passed Littleton Island, the island near which, fourteen months later, the 'Polaris' was lost. When nearly abreast of Cairn Point, the course was shaped for Cape Frazer, on the west side of Smith's Sound. After entering Smith's Sound small patches of ice were seen here and there. At about midnight we came up to the pack, and were obliged to steer off, some to the west where the pack was looser; to the east and north the pack was heavy and close; to the west it was more open and navigable. We had no difficulty in steaming along, for the next morning, at seven o'clock, Captain Hall landed with the boat at Cape Frazer; his object was to examine a small bay to see if it was suitable for a winter harbour, should we be compelled to retreat south again by meeting with heavy ice. He soon returned to the ship, and we commenced steaming again to the north, passing through loose drifting ice till we reached Cape Wilkes. We there emerged into a sea of open water again, no ice to be seen to the north, of any description, either bergs or pack-ice. We steamed along, keeping near the west coast. In the evening a thick fog shut down, which obscured the land on both sides of the channel. We steamed along slowly, meeting no ice. At midnight passed near a small island; its peculiar shape attracted our attention, it being, on its southern side, a perpendicular bluff out of the sea to an elevation of about 300 feet, and then sloping down gradually to the sea on its northern side. We passed near this island in coming south with the 'Polaris' about a year later, and recognised it as being the one passed in the fog going up. There were, also, two other islands near this in Kennedy Channel, one large and one small one; the three extended nearly one-half of the distance across the channel. The channel here was about 18 miles in width. To resume my story: on the morning of the 28th, the fog clearing up, a beautiful sight met our gaze, the sun shone out bright; the land to the north, east and west entirely clear of snow, even in the deep ravines, where, in a much lower latitude, the snow remains the year round, was here almost entirely clear, and the land looked so pleasant and warm that we were anxious to make a landing upon it. On the clearing up of the fog this morning we found ourselves near the mouth of what is now known as the Southern Fiord, at Polaris Bay. Several altitudes of the sun were taken here by different observers. It remained clear about one hour. From our position at this time, looking towards the north, no channel or outlet could be seen in that direction; the Grinnell Land connecting with the Greenland side, some began to think we were in a bay. The fog soon shutting down, we were compelled to lay still here till noon, small patches of ice about. We attempted to make a sounding here, running out 270 fathoms of line, finding no bottom. At noon the fog cleared away again, sun out. Meridian altitudes of the sun were taken; then commenced to steam to the north again. Advancing up towards what is now known as Cape Lupton, we began to open a channel out to the north, which is now known as Robeson's Channel. Early in the afternoon thick snow set in. Steaming slowly through loose drifting ice, the snow compelled us to make fast to the ice occasionally, when it was too thick, and we would steam ahead again when the snow cleared a little. We noticed quite a strong current here setting down the channel to the south-west. The most of the ice here was loose drifting ice, and no difficulty in steaming through it. Clear weather was all we wanted here. The channel, as near as we could judge, at this time, looking up through it, was about 16 or 17 miles in width. We were bothered, more or less, with thick snow till the night of the 30th of August. When we were steaming up the channel through loose drifting ice on the morning of the 31st, passed what is now known as Newman's Bay. Several miles to the north of this, Captain Hall tried to effect a landing, but the small ice near the shore moving so rapidly with the current prevented him, and he was compelled to return to the vessel. Soon after his arrival on board, in steaming up through loose drift ice the vessel was stopped and turned round heading down the channel; the officers were called up, and a consultation held. The result of this consultation was a decision to cross the channel and try to work up the west shore. In crossing this channel we were beset, near the

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middle, and began to drift south with the ice. It was my firm conviction at the time, and has been ever since, that if we had pushed ahead, keeping near the east shore, where we were, in a few hours we could have been out through Robeson's Channel into a large bay or sea beyond. While we were in Robeson's Channel a dark cloud was constantly seen to the north, having the appearance of a water cloud; this same dark cloud was seen by myself and Captain Hall forty-eight days later from the summit of Cape Brevoort, the North Cape of Newman's Bay. I sincerely believe that that cloud hung over a sea or space of open water. I cannot place any blame on Captain Hall for the ship not being pushed ahead. At the time she was first stopped in Robeson's Channel, he was unacquainted with ice navigation in a vessel, and, therefore, was obliged to listen to some one else. I had great confidence in the man before we left the United States, and that confidence was the same up to the day of his death. I am satisfied in my own mind, had his life been spared, the expedition would have been a complete success. There have been many conflicting stories told about the appearance and condition of the ice in Robeson's Channel. I have written to you here just as I saw it, and have given you my opinion about it, and I am confident, in my own mind, that had the 'Polaris' been pushed on at the time we were working up the east shore, a very high latitude might have been reached. After getting beset in the ice in Robeson's Channel we drifted slowly to the south-west down the channel against a south and south-west wind till the 3rd of September, when the ice opening by a north-east wind, we began to steam in towards the east shore of the channel. In steaming in, myself being at the mast-head, I saw a lane of open water about 2 or 3 miles in width, extending as far as I could see to the north up the east shore of Robeson's Channel; the ice had been driven off by this fresh breeze that was now blowing from the north-east, and had cleared the east shore of the channel of ice, and, I have no doubt, but what, at that time, we could have steamed up through Robeson's Channel without hitting a piece of ice; but we continued steaming in towards Polaris Bay, and at midnight, though it was pretty light at that time, we were in close to the shore with the vessel, and I accompanied Captain Hall on shore, who landed, unfurled the stars and stripes, and took possession of the land in the name of the President of the United States. The vessel was soon brought to an anchor, and the next morning the landing of stores, coal, and provisions commenced. Here our vessel lay till the 12th of August, 1872, a grounded iceberg forming our harbour. On the 21st of September the first musk-ox was captured; on the 10th of October following, Captain Hall started on his sledge journey to the north, returned on the 24th, and died on the 8th of November. The ice was broken up in our winter harbour on the 21st of November, and the ship driven against an iceberg. Two days after, the new ice getting sufficiently thick, we sawed the vessel out about 80 feet clear of the iceberg. On the 28th of November, during a heavy gale from the south-west, the pressure of the pack drove the iceberg in on to the vessel; a tongue of the iceberg running under the vessel, raised her up and lifted her over some. The next day, after the gale abated, it would have been an easy job to have sawed the 'Polaris' out clear of this iceberg again; had we done so, the 'Polaris' would have been sound the next spring, and the living aboard of her during the winter, would have been much pleasanter for all of us. I will not tire your patience any longer. There are some little items during this portion of the voyage up that I have omitted, which probably I ought to have put down, but I have given you a truthful outline sketch of it, as far as I am able to do. Hoping that this short narrative will prove satisfactory to your wish, I subscribe myself—Your most obedient and humble servant, H. C. CHESTER,

Late Chief Mate U. S. Steamer 'Polaris.'

IV.

From Mr. Morton.

NEW YORK, *March 12th.*

DEAR SIR,—In compliance with your request I will give you a statement of what I know respecting the voyage of the 'Polaris,' and my opinion, as you request it, in relation to the result.

I went with De Haven in search of Sir John Franklin, in 1850; again with Dr. Kane, in 1853, in which voyage we took the route through Smith's Sound, so that I had the benefit of previous Arctic experience in these two expeditions, and my opinion will be founded upon this previous experience and what I saw while on board the 'Polaris.' My position on board the 'Polaris' was that of Second Mate, and I suppose my opportunities for observation were as favourable as those of any of the officers or men. When the further course of the vessel was checked at 82° 16′ N. latitude, there was a heavy pack of ice in the mid-channel which obstructed her further progress, but to the east there was an opening between the pack and the shore, and a water sky ahead, in that direction to the north-east, indicating very plainly the existence of open water in that direction. There was no indication of land north or north-east. Those who supposed they saw it, saw, in my judgment, a fog bank, which, to inexperienced eyes, is frequently confounded with land. There was an opening also to the west of the pack, but no water sky there, and the land in that direction trended a little to the east of north. The pack which checked our course was setting south at the rate of a mile an hour at the very least, with a strong tide boiling up through any opening it found in the pack. We were nearer the east than the west shore, and Captain Hall, thinking he saw a harbour, went with a boat and landed on the east side, but after examining it twice and finding no harbour, he called a consultation of the officers, consisting of Captains Buddington, Tyson, Chester, Dr. Bessels and myself. Buddington was of opinion that it was impracticable to get further north, and was for returning south for a harbour at Newman's Bay. Tyson was for seeking "a harbour immediately." These were his very words. Chester was for pushing further north, under any circumstances, either to the east or the west. Dr. Bessels was for going to the west, and getting north as far as practicable, his opinion being that as there was open water here, we would find smooth ice and better travelling for sledges, and be nearer the north; and I coincided with Dr. Bessels, at least to the extent of getting farther north. I wished to hold on to what we had, if possible, as every inch was then important, and to take advantage of a harbour if we found one. Hall decided in favour of Dr. Bessels, and the attempt was made to get to the west, but in the effort we were inextricably caught in the pack and were carried by it so far south that we could not get into Newman's Bay. In my opinion, from the appearances at the north-east the vessel might have got farther north. I think if we had not been delayed when we were first obstructed by the pack we might have got to the northward by the east or the west shore some distance, of course one cannot say how far. I have known Dr. Kane to have surmounted greater difficulties than we then encountered. We lost nearly half a day before the attempt was made to get to the north and, in the meanwhile, were rapidly drifting south. Captain Tyson speaks of another consultation in which he recommended another attempt to get north, but I know of no such consultation; and I learn from Captain Buddington and Mr. Chester that no such consultation was held. I never heard of Captain Tyson recommending any attempt to get further north. At the consultation, and from all I have heard him say, he was always in favour of going into a winter harbour, although from the 1st to the 10th of September is the most favourable time for getting north, when there is open water; and there was open water during that time, and, in fact, more

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or less during the winter, while we were in Polaris Bay. There is a very strong current setting to the southward through Robeson's Channel. The heavy masses of ice drifting down Robeson's Channel could not in my opinion get through Kennedy Channel, there being three islands abreast of Cape Constitution, and it is my opinion that a large portion of this ice passed out through Lady Franklin Bay to the westward. It does not get out through the South Fiord, eastwardly, as that is blocked up apparently by icebergs. Dr. Bessels and Mr. Bryan attempted to penetrate in that direction, but were unsuccessful. I think there is an under-current setting through that fiord from the eastward, but it is merely an impression. There was no sledge travelling during the winter or spring of any importance. Had Captain Hall lived, an earnest attempt would have been made with sledges to get further north, for we were well provided, having sixty dogs, two Esquimaux hunters and every facility for sledge travelling; but we passed the winter and the spring feeding the dogs upon pemmican, consuming a large amount of provisions without making any attempt with sledges. This branch was entirely under the separate control of Dr. Bessels. Why he did not make the attempt I do not know. Captain Buddington and the other officers, so far as I know, were willing to give him every facility. So far as any value is to be attached to my opinion from my previous Arctic experience I think the attempt should have been made. Dr. Bessels may have had good reasons for not making it, but I am not acquainted with them. After the snow melted and sledging was impossible, Captain Buddington fitted out boat parties, but they accomplished nothing. They lost three boats, advancing only 18 miles, and had to return overland on foot. While the boat parties were away, we sawed the vessel out from her winter quarters and got out into the open water of the channel with the intention of following up our boat parties to the north. We then made three attempts to get north, but were driven back by the pack-ice. We were short of fuel and had to work the ship under canvas, but she did not carry enough sail to make headway against a headwind and current. In addition to this, all the seamen, except Captain Buddington and myself, were away with the boats, and we had not force enough to make sail. She was a good sea boat, and as fine a one as I have ever been in. The only fault I could find was, that for Arctic exploration the construction of her bows, which were too upright, prevented her from lifting easily, when obstructed by ice, the pressure of ice against her wedging her in, and she did not lift easily over it as the Scotch whalers do. I wish to mention one important fact as contrasted with my previous experience—that is, the greater abundance of animal life as we got further north.

When I was with Dr. Kane, wintering in Rensselaer Harbour, we found no musk oxen, and during two winters only killed two deer. In the early spring we made three hunting expeditions from Polaris Bay and found a great deal of animal life, and musk oxen in abundance. On each occasion we went no farther than 12 miles east and killed twenty-six musk oxen. Had we desired, we could have killed a great number, and laid up beef enough to last for a season. In addition, there were large quantities of brent geese, eider duck, ptarmigan, doveking, besides hares and plenty of seals. The fowl were flying in the spring to the north, whence they return to the south in the autumn. The eider duck and the brent geese hatched their young on islands to escape from the foxes, which destroy their eggs and young, from which I infer, as we saw large quantities of these birds going north every spring, that there must be islands further north, and open water. I know that these birds raise their young on islands, because I have constantly observed it during my former expeditions with De Haven and Kane. We also saw in our journeys into the interior, high grass in the valleys, where the musk oxen feed, in lat. nearly 82°, and I suppose beyond it.* In answer to one of your inquiries, my impression is, from what I saw, that Greenland does not extend to the Pole, but is surrounded at the north by water, but this is only an opinion founded upon the trend of the land to the eastward. I have made three Arctic voyages in this direction, and as I am now fifty-seven years old, I shall not probably make another. If I were to express the result of my experience, it is a firm conviction that the Pole can be reached by this route. I know of no difficulties that would make it impossible. I think it can be accomplished by two vessels properly equipped and manned, and conducted by a competent and resolute leader. Captain Hall was a determined and persevering commander, and had he lived he would, in my opinion, have got much further north, if indeed he would not have reached the Pole itself. The result of my third voyage is that I am more than ever convinced of the practicability and possibility of reaching the Pole, and I firmly believe it will yet be done.—Respectfully and truly yours, WILLIAM MORTON.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

AT the monthly meeting on the 22nd of April, the Vice-President stated that Baron Osten Sacken had resigned the presidency of the section of physical geography, on account of illness, and that M. Rekhnevsky had been elected to fill the vacancy. M. Veniukof, the Secretary, had also tendered his resignation, and M. Wilson had, on the motion of the Vice-President, been elected to succeed him.

M. Wilson then read a programme of the operations of the forthcoming expedition up the Amu-Daria. The course of events of late years had turned general attention to the eastern empire of Russia, and the gradual introduction of Russian civilization there had afforded a good basis for scientific exploration. Among other tracts, the eastern portion of the Tian-Shan, the Pamir plateau and the lower Amu had attracted the special notice of the Society. As the exploration of these regions depended in a great measure on political considerations, the Governor-General of Turkistan was asked to say which of the three schemes it might be most feasible to set on foot first. But previous to the receipt of any reply from his Excellency General Kauffmann, the Society had had the subject of an expedition to the Lower Amu under consideration, in consequence of the receipt of a memorial from Colonel Glukhofsky, who urged the desirability of completing the scientific labours executed during the Khivan campaign, and in consequence a committee, appointed by the sections of mathematical and physical geography, was drawing up a plan of operations, of which the examination of the present as well as of the ancient beds of the Oxus formed a special feature. General Kauffmann was accordingly asked to tender his advice on this scheme, and, his opinion being favourable, the sanction of the Emperor was eventually procured through the Minister of War, the imperial decree giving its permission for the expedition to start during the current year, but stipulating that all exploration should be confined to the Russian possessions on the right bank of the Oxus.

The plan of the different operations was drawn up by the committees of each section, and the whole examined

* Around Polaris Bay there was an abundance of flowers of various kinds and of all colours. The willow grew to a large size; sorrel and grasses were plentiful. The willows farther south are dwarfed, seldom rising more than two or three inches above the ground, while around Polaris Bay they were three feet high, and formed large bushes. I took no observations, but it is my impression that the temperature was milder in Polaris Bay than it was in Rensselaer Harbour, farther south, during the two winters that I passed there.

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by the Council of the Society. The expedition is to be composed of four sections, viz. :—

Firstly.—The geodetical and topographical section, composed of two officers and four surveyors, under the command of Staff-Colonel Stoletof, will execute a careful survey of the delta of the Oxus, and of one or two other tracts of interest, such as the Sheik Jeli range to the east of the river. They will also carry a series of levels from the mouth of the Oxus to the delta; and a third from the Oxus to the Jaxartes. Captain Zoubof, in command of a steamer belonging to the Aral flotilla, will co-operate with this section by surveying the sea face of the delta, by taking numerous lines of soundings, and executing other hydrographical labours.

Secondly. — The meteorological and hydrographic section is entrusted with the duty of studying the climate, the river system and the navigableness of the streams. To this end two stations are to be erected, at one of which hourly meteorological and magnetic observations will be made as well as observations on the depth and swiftness of the Oxus, and on the nature of its bed. At the other station similar observations will be made, but not so frequently. The first will be probably situated at some place like Nukus, where the mass of water flows past concentrated in one deep bed, and the second just below the last of the *aryks* or canals, so as to admit of some estimate being formed of the amount of water carried off for irrigation purposes. The superintendence of this section will be entrusted to M. Dorant, of the Central Observatory, who will be assisted by a deputy, M. Malberg, and several scientific officers from Turkistan.

Thirdly.—The ethnological and statistical section will be commissioned to collect information on the ethnology, the number, and tribes of the sedentary and nomad peoples inhabiting these regions, as well as to describe their manners and customs, their dwellings, dress, currency, manuscripts and traditions, to identify various places mentioned by Eastern writers, and to examine ruins. The duties are entrusted to Colonels Stolelof, and Sobolof, M. Sartlarof, intrepreter, and M. Karazine, a painter.

Fourthly.—The physical section will have to study the geological formation of the Oxus delta, and the various changes it may have undergone, the structure of the basin, and to examine the coast line of the Aral to the eastward (so as to determine the question of its receding by gradual evaporation), as well as the old river beds, which are still visible between the Oxus and Syr Daria, and, lastly, to acquire complete information on the subject of the fauna and flora of the Aralo-Caspian basin. These labours will be accomplished by Messrs. Sivertsof and Barbot de Marny, and M. Simonof, a botanist.

While the detailed plans, which had been separately and minutely laid, were under the general consideration of the Council of the Society, information was received that the Society of Naturalists of St. Petersburg was also organising an expedition of its own to the Sea of Aral. Inquiry being instituted, it appeared that this scientific body were desirous of making a study of the invertebrate fauna of the Aral and Caspian Seas, and of exploring the geology and zoology of the Ust-Urt plateau, the north part of the Chink, and the lower Oxus, as far as the Sheik-Jeli range, so as to arrive at some definite conclusion on the possible former union of the Aral and Caspian Seas. But this expedition would not probably start till late in the autumn. The two societies, it thus appeared, would not clash in their labours—one working to the east and the other to the south-west of the Sea of Aral—except, perhaps, in the neighbourhood of the Sheik-Jeli hills; it seemed thus desirable that this latter part of the operations, as well as the geological exploration of the Oxus delta, should be done by the same person, and M. Barbot de Marny, with the consent of both societies, undertook the task.

Many foreigners had manifested a desire to join the Oxus expedition, and the Russian Government had permitted Major Herbert Wood, of the Royal (late Madras) Engineers, to take part in it.

Although a little disappointment might be felt that the expedition was not to be on the scale at first proposed, the results, it might be confidently anticipated, would prove of the very highest value in greatly enlarging our knowledge of Central Asia.

The proposals of Colonel Glukshofsky, referred to above, for the carrying out of some scientific works in the region between the Aral and Caspian, had been laid before a Committee of the mathematical and physical sections, who reported that the proposals embraced projects for the carrying of a series of levels from the Caspian to the Aral, so as to determine precisely their respective altitudes, for the carrying of another series along the entire length of the dry bed of the Oxus, and for exploring that tract between the Lower Oxus and the Bay of Krasnovodsk, where the remains of dried up canals are so frequent. The committee reported that there was every prospect of the first project being carried out, as, during the ensuing summer—from April to September—two detachments of the Orenburg division would be encamped on the Ust-Urt, and the levels could thus be carried by the shortest route, which is only about 350 versts long. The expense was estimated at about 10,000 roubles, and through the intervention of His Imperial Highness, an Imperial Decree has been obtained granting the sum named. The work will be carried on under the direction of Colonel Thillo of the Orenburg section. With reference to the second project, which has an important bearing on the eventual opening of a trade-route between Europe and Central Asia, the Society is still in correspondence with the Government of the Caucasus, and with M. Middendorf, who has been requested to take in hand the natural history branch of whatever scheme is determined on. The probable expense is not yet known, but Colonel Glukhofsky has generously contributed a sum of 3000 roubles.

Colonel Glukhofsky is organising a caravan in Moscow, which is to travel as far as Cabul, by way of Astrabad and Herat and return by the Bamian Pass, Balkh, Bokhara, Khiva, and Krasnovodsk, and he has suggested to the Society the desirability of attaching an observer to the party. M. Ogorodnikof has been accordingly selected for this duty, and he will lay down a route survey, take height observations, and collect all the information he can on the road, a sum of 300 roubles being placed at his disposal to defray incidental expenses.

M. Minaief has also left St. Petersburg on a more distant mission; his object being the study of the languages, ethnology, and primitive Buddhist religion of Burmah and Ceylon. He also proposes to devote attention to the mountainous races of Nepaul and Afghanistan, and to make a careful comparison between the Buddhist *Stupas* and the Kurgans so common in Russia. The Society is unfortunately unable to afford pecuniary assistance to M. Minaief, but it has provided him with letters to the Indian authorities, and has begged the Governor-General of Turkistan to assist his researches by all the means in his power.

M. WILSON concluded his report by mentioning the titles of some new publications of the Society.

A vote of thanks was then passed, on the motion of the Vice-President, to Colonel Glukhofsky for his active interest and co-operation in the schemes indicated above, and the meeting adjourned after M. Rittich had given an interesting account of his progress in compiling an ethnographic map of Russia, a task which is approaching completion, and which will form a standard work of reference for future students.

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FRENCH GEOGRAPHICAL SOCIETY.

Meeting of April the 10th, 1874.

ADMIRAL DE DOMPIERE D'HORNOY, Minister of the French Navy, announced that M. Delaporte and his companions had been recalled to France in consequence of severe illness, therefore the mission to the Cambodje was postponed. The Admiral urged that the sums granted by the Society should be reserved for a future mission.

M. DUVEYRIER read a letter he had received from Dr. Schweinfurth, dated El-Kharghé, in the Great Oasis, 12th March 1874. The doctor states that he had not observed any kind of carving or sculpture on the rocks of the countries of the western tributaries of the Upper Nile, nor had he found any traces of the Dinka, the Bongo, the Mittou, the Kredj, and the Monbuttu having ever lived there in a condition different from that which they now present.

Dr. HAMY, referring to this part of Dr. Schweinfurth's letter, reminded the meeting that on a former occasion he had stated that the Bongo resembled more the Soaqwa, or Bosjesmen, than the Akka. Having lately examined the types collected by Froberville in the Makwa country, he had discovered in them evidence of the transition between the Soaqwa and the Bongo.

M. MAUNOIR read a letter received from M. CHARLES GRAD, in which he states that the Committee of Polar Exploration in Bremen had named a cape in Greenland after the French voyager Blosseville. A letter was also read from M. TISSOT, French Minister at Tangier, containing a review of the present political condition of Morocco. M. Tissot announces that his narrative and map of a journey from Tangier to Fâs and Rabat are now ready. He has discovered the traces of the entire Roman road. He also announces his intended journey towards Zerhoun, and adverted to an error that had crept into the report of a preceding meeting; namely, that the Latin inscriptions he had discovered are at Qaçar Fara'ûn, anciently called Volubilis, and not at Mulaï Idrîs, which is identical with Oualili.

General Meeting, April 25th, 1874.

PRESIDENT'S ADDRESS.

THE President, Vice-Admiral Baron DE LA RONCIÈRE LE NOURY, opened the session by an address before a crowded audience. He first alluded to the unceasing work of death, which a few months before had imposed on him the painful duty of paying a tribute to the memory of a departed friend—the late President, Marquis de Chasseloup Laubat—and which now again compelled him to open his address with words of mourning and regret. The year 1873 had seen two men disappear who had devoted their whole lives to the progress of geography, and whose works had furnished Europe with a vast amount of valuable information. These two men were David Livingstone and Francis Garnier. The President dwelt more particularly upon the funeral ceremony of the great explorer, Livingstone, which he had attended as the representative of the French Geographical Society, not alone to express the condolence of the Society, but to show that it was not England only who had to mourn the loss of such a man, and to prove also the confraternity which should exist between those associations, which, setting aside the sterile struggles of politics, had borne themselves above international jealousies, and united their efforts for the advancement of science, and consequently for the welfare of mankind. He was deeply impressed by the great number of people who filled the vast nave of Westminster Abbey, revealing as it did the profound interest excited by the labours of Livingstone, and clearly showing that the English nation, proud of its traditions and jealous of its fame, knew how to honour those men who added so much to their country's greatness. The President was deeply impressed not only by the solemnities of the funeral, but by the homage paid by the English to that science which has inspired so many sacrifices, furnished so many victims, and given expression to those true but cruel words—"The death of the traveller is geography's glory."

Amid these affecting scenes Admiral de la Roncière's thoughts wandered irresistibly to the unfortunate Garnier. He gave a sketch of his character, and showed how, full of that perhaps thoughtless ardour which inspires great undertakings, he could not refrain from imprudences which in all his travels had been crowned with success, but which alas! at last proved fatal to him. The President reviewed Garnier's life from his birth at St. Etienne, in the year 1839, and followed him to the school at Montpellier, and to the naval school. His first voyages found him in the Brazilian waters and across the Straits of Magellan into the Pacific. On his return to France he was sent to China. After a campaign under Admiral Charner, to whose staff he was attached, Garnier again returned to France, where he attended the School of Artillery practice at Vincennes, and simultaneously associated himself with several scientific works. He was then called back again to the far East. He halted at Cochin China. The French establishment there was thoroughly reorganised, and the French authority strengthened under the superior direction of the Marquis de Chasseloup Laubat, owing as much to the force of arms as to the wise measures of that eminent minister. Garnier, at that time but twenty-three years of age, was appointed to the post of inspector of the affairs of the natives, and entrusted with the administration of the most important town of the French colony, Sholen, near Saïgon. Here he gave full vent to his adventurous and fecund imagination. His sagacity demonstrated to him that the development of French influence should not be limited to the territory of the newly acquired colony. There are to the north unknown countries which must be explored, and the large rivers flowing out of those countries to the south must become the arteries of a future commerce. Garnier's object was to penetrate through Laos into Tibet, the natural road thither being the Mekhong. The minister accepted the persevering suggestions of the young officer, and decided that a mission should be sent; but its initiator, not being old enough to have command, was placed under the orders of Captain Dondartde Lagrée.

The PRESIDENT said that it was not the proper time to revert to the events of that long journey, during which the chief of the mission perished, leaving the command to his second. Garnier took upon himself the difficult task of conveying the body of his commander for the rest of the journey, and finally buried it at Saïgon on French soil. Numerous publications have related the fatigues and shown the results of the labours achieved by that mission, and the excellent narrative of the journey contains an account of the enterprises and successes, of the hopes and fears of the explorers, on their journey of nearly 10,000 kilometres, two-thirds of the distance having been traversed in boats and one-third on foot.

The reward of that grand enterprise was the Gold Medal of the French Geographical Society, and Garnier's admission as a member. At the same time the Gold Medal of the Royal Geographical Society of England was awarded to him, and the Asiatic Society of England elected him a Fellow, their number being limited to a hundred. Lastly, in 1871, the International Congress at Antwerp granted to him, as well as to Livingstone, a medal of honour.

During the Franco-Prussian war, being shut up inside Paris, he was attached to the 8th sector, where his conduct attracted notice. After the capitulation of

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Paris he returned to his favourite studies, and with the aid of one of his companions, M. Delaporte, formerly his pupil, and who may, perhaps, be his successor, published his work. The book obtained for its authors medals of honour at the Vienna Exhibition.

In view of completing his researches, he again started for Cochin China. The Mekhong River, however, did not permit of communication with Tibet, through Laos, consequently he had to search for another road. But political circumstances compelled him to give up all hope of starting an expedition in the empire of Annam. Unfit for a life of inactivity, he went to China, and undertook to explore, at his own expense, the upper course of the Yang-tze-kiang, a river which he ascended to its waterfalls. On his return he was called to Saïgon by Admiral Dupré, governor of Cochin China, and commissioned to Tong-king, a country that was to be again rendered a dependency of the court of Hué. Garnier looked upon the mission as a new field for discovery. He made himself master of Hanoi, the capital of that rich country, and succeeded in re-establishing order. Some rebels, however, still remained unruly, but were vigorously attacked by Garnier. In that obscure scuffle he met his death, in the midst of a most exemplary and brilliant career, and which promised so much for his country.

The PRESIDENT regretted that he was compelled to abridge the details of such a valuable life for want of time. Briefly referring to the death of M. de Billy, General Inspector of Mines, he concluded his address with an account of the proceedings of the project of the international congress which is to be held in Paris in 1875.

M. MALTE BRUN delivered the report of the Commission for the rewards, concluding with the grant of a Gold Medal to Mr. Alphonsus Pinart, for his travels and observations on the north-western coast of America.

M. H. DUVEYRIER then read a paper on the life and labours of Dr. Livingstone.

M. A. LE MERCIER read a notice on the foundation of the French Alpine Club, and Abbé BOUCHE, formerly a missionary at Dahômé, read a paper on the Slave Coast of the Gulf of Guinea.

Meeting of May the 8th, 1874.

M. DUVEYRIER read a letter he had received from M. N. Dournaux Dupéré. On the 27th of March, he was about to leave Ghadâmès, in company with two Ifôghas Touâreg, and to follow the road of Rhât, in the neighbourhood of which oasis he hoped to meet with Ikhenoûkhen, the most powerful chief of the Azjer confederation in order to settle with him for the continuation of his journey. The letter gave valuable information concerning the present political state of the Sahara. M. Duveyrier took that opportunity of refuting some disheartening rumours which had found their way into the newspapers, according to which M. Dournaux Dupéré had fallen a victim to the barbarity of the Touâreg in the vicinity of Rhât, about the 20th of April. These hearsay tidings reached Algiers on the 6th of May. As the traveller had started from Ghadâmès on the 27th of March, he could not reach Rhât in less than twenty-four days with a caravan. Had he been killed on his arrival, and the tidings of the event sent directly to Algiers, it could not have been known there before the 14th of May; the news therefore was not worthy of belief.

Abbé DURAND read a letter he had received from FATHER DUPARQUET, who announced his arrival at Punta Negra, the scenery of which place is very beautiful, and the climate most salubrious. Eight kilometers from Punta Negra, the river Luiza Loango issues from a lake. The missionary enumerates the factories established there, one of them, Massabé, being at the mouth of the river. The French missionaries have chosen Landana for their station, which lies in the middle of a rugged country.

The President of the Council, M. DELESSE, informed the meeting that the President of the Republic had given Admiral de la Roncière to understand that steps would be taken towards securing future support for the widow and child of Francis Garnier.

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VIENNA GEOGRAPHICAL SOCIETY.

AT a meeting of the above Society on the 28th of April, Professor Von Hochstetter being in the chair, Colonel Goodenough, military attaché at Vienna, who on several occasions had afforded valuable assistance to the Society, and through whose instrumentality an important collection of works on British India had just been presented, was elected as corresponding member.

News from Brisbane was read, by which light is thrown on the mysterious end of the German traveller, Ludwig Leichhardt, of whose fate and disappearance in Central Australia in the year 1848 nothing had hitherto been known. In February last, Andrew Hume, who in 1872 had been sent out by the Sydney Government to search for traces of Leichhardt, returned to Brisbane with the news that he had discovered Classen, Leichhardt's fellow traveller, living amongst a tribe of bushmen at the head waters of Stavart's Creek. Classen had grown very weak and aged, but refused to leave his associates. He nevertheless furnished Hume with all particulars of Leichhardt's end. According to his story, he (Classen) had separated from the main body of the expedition and was ranging about in quest of water, when a mutiny broke out among Leichhardt's followers, who finally deserted their master and set off in a north-westerly direction. When Classen returned he found Leichhardt bereft of all supplies, the mutineers having stripped him of tents, horses, and the whole of his equipment, and left him to die, a fate to which Leichhardt succumbed five days later. According to Classen's present companions, the mutineers were eventually slain by natives whom they fell in with, in their attempt to reach the more populated districts of South Australia.

Hume brought home Leichhardt's quadrants, his watch, and about seventy-five pages of his notes; nevertheless, Hume's account has found many unbelievers, but it may be fairly presumed that a satisfactory conclusion respecting its veracity will soon be arrived at, as the objects found have been forwarded by him to the Government authorities at Sydney.

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THE

GEOGRAPHICAL MAGAZINE.

JULY, 1874.

INDIAN MARINE SURVEYS.

ONE of the most obvious duties of a Government ruling a country with an extensive sea-board and a great sea-borne trade, is to provide for the safety of the vessels which frequent her ports, by the provision of lighthouses and buoys, and, above all, by the preparation of reliable charts and sailing directions. Some works and duties, such as the construction of railways and canals, may sometimes be undertaken by the State and sometimes by private persons; but there are others which, from their nature, must be the business of the Government. Among the latter, the erection of lighthouses and the execution of marine surveys are the most obvious. They must either be undertaken by the State or not at all. As regards Great Britain these duties have always been fully recognized, though often indifferently performed; and they have been divided between the mother country and her great Indian dependency.

While the important work of the Hydrographical Department of the Admiralty, some account of which will be found in our number for April, page 18, has ensured the safety of our ships in approaching the shores and harbours, not only of our own islands, but of other countries far and near, the great East India Company undertook a similar responsibility along the shores of those eastern countries, of the trade of which it so long held the monopoly. As the commerce with India and the far East continued to increase, the necessity for reliable charts and sailing directions became more pressing; while at the same time an armed marine, which was formed at Bombay, very early in the last century, to resist the pirates of the west coast of India, furnished the rough material for surveyors. In fact, the East India Company took the lead, and was in advance of the Admiralty, both in organizing efficient surveys and in appointing a hydrographer to utilize their results. Mr. Alexander Dalrymple, a Madras civilian and a most indefatigable collector of geographical materials, was appointed hydrographer to the East India Company in 1779. The same officer was the first hydrographer of the Admiralty, retaining his appointment under the Company, and holding both places from 1795 until his death in 1808.

Dalrymple's work from 1779 to 1808, a service of nearly thirty years as Indian hydrographer, was extremely valuable: it chiefly consisted in the collection and publication of all existing materials. He not only engraved the charts of our own surveyors, but collected all the previous surveys of Van Keulen and other Dutch navigators. He thus accumulated a vast number of engraved charts of varying age and value. An almost complete collection of them has been saved from destruction and made available for reference by the present Geographical Department of the India Office, where they have proved of practical use on several occasions: for in the consideration of questions connected with the improvement of harbours and other kindred projects, the means of reference to documents showing the state of harbours and coast lines at various periods, is always desirable and often very important.

Before Dalrymple assumed his position as hydrographer, the work of the marine surveys had been commenced in India. There was a local hydrographical surveyor at Calcutta, in the person of Captain John Ritchie, from 1770 to 1785, whose charts were engraved by Dalrymple, and whose manuscript notes are preserved in the Geographical Department of the India Office. He delineated the coasts of part of the Bay of Bengal; but his latitudes and longitudes were taken afloat, and his soundings were barely more than sufficient to show the tracks of his vessel. His successors were Captains Huddert, McCluer, Wedgborough, Blair, and Topping. Huddert fixed a series of positions along the Malabar coast, between 1780 and 1790; McCluer continued the surveys on the west coast between 1790 and 1793, and Lieutenant Wedgborough prepared the charts, which were promptly engraved by Dalrymple. Lieutenant Blair was very actively engaged, between 1777 and 1795, on the Kattiwar coast, Salsette, and various patches here and there; but his great work was the survey of the Andaman Islands, an account of which was recently re-published in the selections from the Records of the Government of India.* Port Blair is named after this surveyor. Old Michael Topping was the inaugurator of surveying work on the Madras side. In 1788 he prepared a rough chart of the Bay of Bengal; in 1790 he made a plan of the anchorage at Coringa and the mouths of the Godavari, accompanying it with a valuable memoir; and in 1794 he became chief surveyor at Madras, where he drew up a general plan for the improvement of the navigation of the Indian seas. To this early period may be referred also the work done in the Red Sea by Sir Home Popham's officers in 1800, and by Captains Court and Maxfield, in 1806, under the auspices of Lord Valentia.

* Home, No. 24.

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Dalrymple's term of office covers the first period of Indian Marine Surveys, when there was no attempt at a trigonometrical basis; positions were fixed from the ships, and soundings did little more than show the ship's tracks. With Horsburgh in England, and Court and Ross in India, commenced an improved and more scientific system; and the Horsburgh reign, from 1810 to 1836, was the most flourishing and efficient period of Indian Marine Surveys.

James Horsburgh, commencing life as a cook and cabin boy, eventually rose to the command of an Indiaman, and on his return to England in 1806, the publication of a set of his charts at once placed him in the first rank of hydrographers. After many years of indefatigable research, he completed his *East India Directory*, which is still the recognized guide for the navigation of the Indian seas. The first edition appeared in 1808; the eighth in 1865; and the ninth and last, edited by Captain A. Taylor, and adapted for the new route to India by the Suez Canal, was reviewed in our number for April, page 27. Horsburgh continued to superintend the compilation and publication of charts, the results of Indian surveys, from 1810, until his death in 1836. When Horsburgh took up his appointment in Leadenhall Street, Captain Court was selected for the post of Marine Surveyor-General at Calcutta; and Captain Daniel Ross, "the Father of the Indian Surveys," was engaged in surveying the coast of China. Ross's charts were published as they were completed, and the whole were incorporated into a general chart by Captain Horsburgh; while Court, Maxfield, and Maughan did similar work in the Bay of Bengal. On the death of Captain Court, in 1823, he was succeeded at Calcutta by Daniel Ross, who was the first to organize a really scientific method in Indian Marine Surveys. In 1828 there was one of those fits of ruinous economy which periodically sweep over India, and do as much harm as a war or a famine. But stout old Ross weathered the storm. He was unceasing and importunate in urging the resumption of efficient surveys, and in 1830 he, and his second lieutenant Lloyd, were again at work on the Arracan coast, and the Mergui archipelago. Ross did his work with great care and regard for scientific accuracy, and it was all on a trigonometrical basis. He measured bases on shore, and all the angles were verified by astronomical observations. He resigned in 1833, and was succeeded by his able assistant Lloyd, who surveyed the whole sea face of the Sunderbuns, and continued the work of his predecessor with zeal and energy. But on his retirement, in 1840, the Marine Surveyor-Generalship at Calcutta, was abolished. The work of the Indian surveyors of this earlier period was very good. Admiral Collinson, when surveying in China, had opportunities of testing several of their charts, and he bears testimony to their accuracy. Indeed it surprised him to find how much further advanced the Indian officers were than the marine surveyors of the same period in England.

During the twenty years between 1820 and 1840 there was much admirable work achieved by the surveying officers on the Bombay side of India. The Persian Gulf was surveyed by Captain Guy, who commenced the work in 1820, and completed by Captain Brucks and Lieutenant Haines in 1830; and in the course of this service we find in the list of Persian Gulf surveyors several distinguished and well-known names, who then commenced their training. There were Haines, the first Governor of Aden; Kempthorne, the commentator of the voyage of Nearchus; Ethersey, the surveyor of the Gulf of Cambay; Lynch, the future explorer of the Euphrates; and Whitelock, the author of several interesting papers; while the charts were drawn by Lieutenant Houghton, a most accomplished draughtsman. When the old Bombay Marine was converted into the Indian Navy, in 1832, a fresh impetus was given to the surveys. Sir Charles Malcolm came out as the first commodore, and the surveying service saw its most palmy days during his administration. He was also the founder of the Bombay Geographical Society, and afterwards one of the most active promoters of the Hakluyt Society. The survey of the Red Sea was commenced by Captains Moresby and Elwon in 1830; the former opening the work of the northern half by measuring a base at Suez. The survey was steadily continued to its completion in 1834, by a system of triangulation down either shore. The sea was then practically unknown, and great dangers and privations were inseparable from such a service; but the officers were admirably selected, and steadily faced and overcame the difficulties. Under Captain Moresby were Barker, the future Abyssinian traveller; Wellsted, the accomplished author; Christopher, the explorer of the Indus, who afterwards fell gloriously at Multan; and Felix Jones, who, though then very young, was already pre-eminent as a skilled draughtsman. After the completion of the Red Sea Survey, Captain Moresby surveyed the Maldive Islands between 1834 and 1838; Powell and Ethersey examined the coasts of the Gulf of Manaar; and the south coast of Arabia was surveyed by Captain Haines, assisted by Sanders, Cruttenden, and Grieve. During this period Ethersey, in a miserable native craft, executed the existing survey of the Gulf of Cambay, of portions of the coast between Surat and Bombay, and of the dangerous shoals off Surat, called the Malacca Banks. In these years also Lieutenants Wood and Carless explored the Indus, and Wood crowned the geographical services of the Indian Navy, in 1838, by the discovery of the source of the Oxus.

After the retirement of Sir Charles Malcolm, all the surveying vessels were recalled, and from 1839 to 1844 the surveys were almost entirely suspended. Indeed, from 1838 until the destruction of all progress in 1861, the surveys are due to the zeal of the officers themselves, working in the face of every sort of official discouragement and obstruction, and no share of credit belongs to their superiors. Men who had been trained under Lloyd and Moresby, and whose zeal had been encouraged by Sir Charles Malcolm during several years of progress, could not so easily be turned from their useful careers. They worked on, in spite of official discouragement. The provision for the compilation of their charts was incredibly wretched. The chart office was in one corner of a sail loft in Bombay dockyard, where the cockroaches and white ants fed upon documents of priceless value; and the office of draughtsman, held by Captain Montriou from 1847 to 1852, and by Lieutenant Fergusson from 1852 until the end came in 1862, was only represented by an establishment consisting of one officer and two natives for copying, at a total cost of 500*l.* a year. It was under such a system, and in wretchedly ill-found

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vessels, that Captain Sanders completed the survey of the Arabian coast; that Selby trigonometrically surveyed the west coast of India from Cape Comorin to Beypur, and the Bombay bank of soundings; that Carless made a beautiful survey of the African coast from Ras Hafun to Ras Gulwaini; and that Taylor made his admirable survey of the Gulf of Cutch. But a fair idea may be formed of the official value that was attached to all this inestimable work, by a single fact connected with the survey of Captain Carless. It was executed in 1838. In 1843 the steam frigate 'Memnon' was wrecked on the very coast that had been so well surveyed a few years before. It was found that the manuscript work of Captain Carless had been thrown on one side when it was sent to the Bombay office, and had never been engraved. His chart was then, after the mischief was done, ordered to be published. One other example of the spirit which animated the authorities may be given. Of course, no naturalist was allowed for the surveying ships, but it is well known what valuable geographical and geological work was done by Dr. Carter, the medical officer with Captains Sanders and Grieve, during the second survey of the Arabian coast. Yet his position as a scientific man was not recognised, and he was required to pay his own boat hire.

It is to the officers alone that the credit of the surveys is due, and an able staff continued to work on, until the officers of the Indian Navy were turned adrift in 1861. Fell completed a survey of the Coromandel Coast from Pulicat to Bimlipatam in 1851; Ward examined parts of the Burma coast between 1851 and 1859; Heathcote was engaged upon surveys in the Bay of Bengal from 1856 to 1862; Sweney continued the work on the Coromandel Coast in 1860 from Pulicat to Point Calimere; and other officers of the Indian Navy carried forward a survey of Mesopotamia, which was abruptly put a stop to by the Government in 1865, leaving it incomplete, and with much work still to be done. The survey of the west coast of India, between Bombay and Beypur, with the exception of a few detached bits, had not been revised since the old charts were drawn by McCluer, in the last century. This most important work was entrusted to Lieutenant A. D. Taylor, who received the command of an old native craft. Such was the sort of care bestowed on the surveying service by the authorities. He commenced work in 1853. The whole of Taylor's survey was admirably executed on a trigonometrical basis, and occupied six years, from 1853 to 1859. In 1860, Lieutenant Whish made a complete survey of Bombay Harbour; and, between 1857 and 1860, Captain Constable and Lieutenant Stiffe made a careful revision of the old survey of the Persian Gulf.

In 1862 the Indian Navy ceased to exist, and all the surveys were abruptly stopped, and left incomplete. The stock of charts, with the copper plates, original drawings, and sailing directions were transferred to the Admiralty; and it was suggested, but not agreed to, that the future surveys of the Indian coasts should be conducted by the Royal Navy, and at the expense of the Imperial Government. The very few surveying vessels equipped by the Admiralty had other work to do, the Treasury had no intention of paying for Indian surveys, while the Government of India entirely abandoned the duty. Large stretches of coast were still unsurveyed. Others very urgently needed revision, especially near the mouths of rivers, where there are constant alterations. At the same time, the need for accurate charts became every year more urgent. The coasting trade increased enormously, the British India Steam Navigation Company established a line running regularly round the Indian coasts, and touching at many anchorages, and new and unsurveyed ports were opened. Wrecks and disasters multiplied, while ignorance of unsurveyed shores led to heavy loss and serious delays. Yet years passed away, and nothing—absolutely nothing—was done by the Government. The great duty of providing reliable guides to the ports of India, in the shape of charts and sailing directions, was totally abandoned.

Ten years passed away. At last, in 1871, memoranda were prepared in the Geographical Department of the India Office, setting forth the disadvantages which have resulted from the discontinuance of the marine surveys, and urging the necessity of providing some efficient organizations for resuming and continuing them. These memoranda, with other documents, were forwarded to India, for the consideration of the Government in March 1871, and they were afterwards presented to Parliament. In June 1873, after a delay of two years, the Government of India requested that Captain A. D. Taylor, of the late Indian Navy, might be deputed to Calcutta, to advise them, and to give assistance in devising suitable measures for remedying the evils that had been pointed out. A better selection could not have been made. Captain Taylor had been employed, during many years, on Indian Marine Surveys, and had done admirable work in the Gulf of Cutch, and on the west coast; subsequently, preparing charts and sailing directions. He has ever since taken an ardent and hearty interest in the subject, more than once raising a warning voice touching the serious consequences of the long neglect of a great duty. Moreover, he has quite recently completed a new edition of *Horsburgh's Directory* (which was reviewed in our number for April, page 27), a most appropriate undertaking for an officer who, it may be hoped, will shortly, in some measure, take Horsburgh's place, and restore the long neglected marine surveys of India to usefulness and efficiency. Captain Taylor arrived in Calcutta on December 22nd, 1873, and has since prepared a careful and complete review of existing Indian charts, or materials for charts, and a scheme for the execution of all necessary surveys in future.

The result of Captain Taylor's searching investigation has been to convince the Government of India that in many places the charts are defective, and that even where really good charts once existed, they have, in some instances, become obsolete, through the absence of a Survey Department, whose duty it would be to ascertain and record changes effected by nature and by art.

An enumeration of a few of the *desiderata* will show what twelve years of neglect have done. Commencing from the east, in the first place a more accurate survey of the Chittagong River is needed, including an examination of the Nauf and Fenny Rivers. If the navigation of the latter had been known, the Ganges River steamers might *now* (during the S.W. monsoon, when there is too much wind and

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swell for small steamers to emerge into the bay and run into Chittagong) proceed to a point whither food grain could be brought from the Chittagong district. But the Fenny River mouth is unknown. Still more marvellous is it that the distance that sea-going ships can be taken up the eastern mouths of the Ganges—the Megna mouths—is equally unknown. Next comes the coast of India, from Point Palmyras to the Santapilly rocks, a distance of 270 miles, which is still unsurveyed. Coringa Bay must also be re-examined. The mid channels in Palk Strait and the Gulf of Manaar, being the approaches to the Paumben Pass, are still unsounded, and are a blank on our charts. On the west coast of India, the port of Colachull, whence the coffee of Travancore is exported (see *Ocean Highways* for February, 1873, page 352), has never been surveyed, nor has the deep water between Enciam Islet and the mainland. More soundings are needed between Beypur and Calicut; the mud banks of Alepi and Narakal should be surveyed; Cochin and Mangalore require periodical examination, as well as the shifting mouths of the Karwar River; while the great development of trade urgently calls for large scale surveys of the ports of Honore, Vingorla, Ratnagiri, Viziadrug, Jaighur, and Jinjerah. Bombay Harbour was well surveyed by Lieutenant Whish in 1861, but a revised plan is now necessary, as it has hitherto been no one's business to give notice to the Admiralty of changes in the positions of buoys and landmarks. Lieutenant Palmer, R.N., the officer in command of the iron-clad 'Mágdala,' at Bombay, is to make an elaborate survey of a portion of the bottom of the harbour, with reference to a system of defence by torpedoes; and it would be well also to examine the channels leading to and from Hog Island, and the Panwell and Tannah Rivers. Above Bombay the coast has never been properly examined, and certain portions have been neglected absolutely. The foul ground off Dáru requires immediate attention, as well as Damaon, Bulsar, and the entrances to the Surat, Broach, and Tankria Rivers. The Gulf of Cambay was surveyed by Ethersey, but the work was not completed when he was recalled in 1836; and the whole gulf now requires thorough re-examination. On the coast of Kattiwar, the great increase of the trade makes the execution of more minute plans of Baunagar, Gogo, Shalbet, Jafrabad, Diu, Dwarka, Poshatra, Seraya, Juria, and other harbours and anchorages, a very urgent need. Soundings are also required of the entrance to the Gulf of Cutch, and the principal mouths of the Indus.

Banks at the mouths of great rivers require periodical examination, as well as the bars of minor rivers; for there are constant alterations in the forms of banks, and this important service demands the continuous attention of three or four vessels round the whole coast of India. Another very important point is the connection of the land and sea surveys, which will be easy along some parts of the coast; especially that of Kattiwar, where Colonel Walker's Topographical Survey offers facilities; and on the unsurveyed coast from Point Palmyras to Bimlipatam, where Colonel Saxton has formed a line of secondary triangulation. The progress of the Great Trigonometrical and Topographical Surveys renders this connection easy of attainment, and will be a great advantage, by making both land and sea surveys more serviceable and complete.

With reference to the great and growing importance of the mercantile marine, and especially of the coasting trade, the Government of India are ready to accept the responsibility of completing and maintaining the charts of the Indian coast-line from the Pakchan estuary, at the southern extremity of Tenasserim, to Sonmiani Bay on the western limit of Sind; including the Andaman, Nicobar, and Laccadive Islands, and the Mergui Archipelago. But the surveys of the Persian Gulf and Straits of Malacca, of the Arabian coasts and Red Sea, must be looked for from the Admiralty, and must be executed at Imperial expense. When the old East India Company had a monopoly of the trade from Mocha to China, the provision of charts for all the coasts over that vast area became a part of their obvious duty. But such responsibilities no longer appertain to the present Government, which is only bound to provide for the safe guidance of vessels along the coasts, and into the ports of British India.

It is proposed that the new system for the provision of accurate charts shall be controlled by a superintendent of marine surveys, to reside in India, who will regulate the proceedings of surveying vessels, supervise the plotting and the reproduction of charts by photozincography, maintain a correct record of buoys and lights, and transmit the earliest information of any changes. The officer recommended to fill this important and responsible post is Captain Taylor, than whom no man living has a more intimate acquaintance with Indian marine surveys, or takes a deeper interest in their efficiency. The charts will finally be printed and published in England by the hydrographer to the Admiralty. The surveying flotilla will, it is proposed, consist of five sailing vessels, which can be provided from those already in the marine service at Bombay and Calcutta; and each will be supplied with a steam pinnace; and there will be one fair-sized steam tender. The sailing vessels will generally be at anchor, and will be used as marks for the steam pinnaces, while they are away surveying. It will be a very difficult matter to find a sufficient staff of surveyors in the present depressed condition of the surveying service in the Royal Navy, for no young officers are now trained for this important work, and when a vacancy occurs, even in the most responsible posts, it is no easy matter to fill it up. Probably it will be found necessary to train some of the younger officers to surveying work. One very important part of the complement of officers in a surveying vessel, which is so utterly neglected by the Admiralty, will not, it is hoped, be overlooked in India. No one who is acquainted with the work of Dr. Carter, can doubt the advisability of appointing to every surveying vessel, a medical officer who is also a naturalist, and who is possessed of general scientific taste and acquirements. The opportunities offered, during service in a surveying vessel, for observing and collecting, are so exceptional, that it would be shameful to neglect them.

It is hoped that the work may be commenced, in the end of the present year, with the unsurveyed portion of the coast between Point Palmyras and Bimlipatam, and perhaps also the Megna mouths of the Ganges; and the surveys will be carried on in communication with Colonel Thuillier, the Surveyor-General, and will be connected, wherever it is possible, with the points of the Great Trigonometrical Survey.

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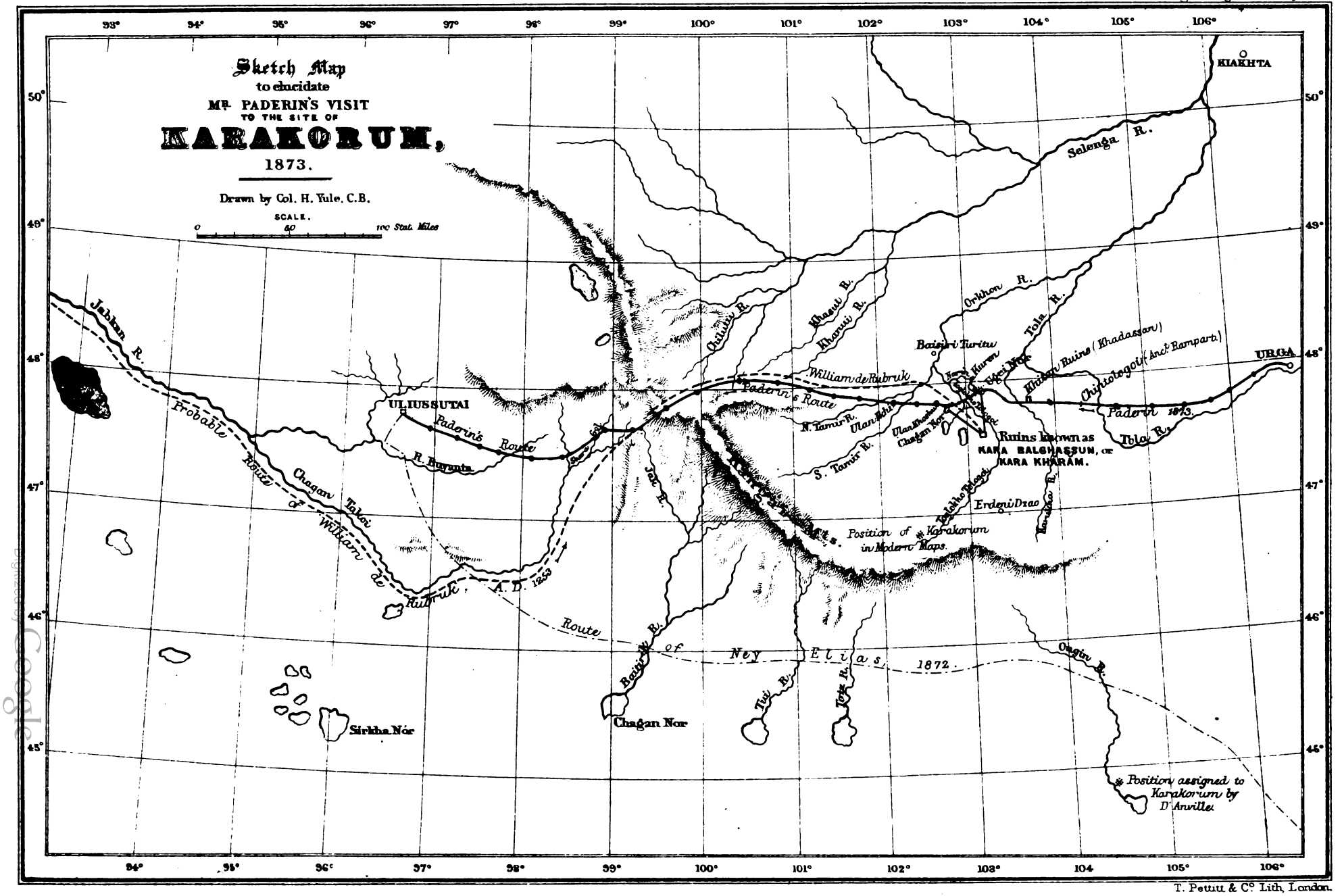

T. Pettit & Co Lith, London.

The completion of the marine surveys is now considered, by the Government of India, to be a work of pressing necessity; and thus they will once more be restored to efficiency, and due provision will be made for the safety of the vast and increasing mercantile fleet which visits the ports of India every year, and is constantly navigating along its coasts.

VISIT OF MR. F. PADERIN TO THE SITE OF KARAKORUM.

IN the *Geographical Magazine* for May (p. 47) reference was made to this reported visit, and expression was given to the present writer's disappointment at having seen no account of it. Since that was published, Madame Fedchenko has most kindly sent me a rough translation of the account published in the *Bulletin of the Imperial Geographical Soc. of St. Petersburg* (vol. ix., No. 10, 1873); and as other readers, probably, of the *Geographical Magazine* may be interested in the subject, I now send an abstract of the paper, with such remarks as suggest themselves.

The account is contained in a letter from Mr. Paderin to A. E. Vlangali, dated Uliussutai, July 20th, 1873. The visit to the site was made during a journey from Urga to Uliussutai. And we had better say at once that the site visited, and which Mr. Paderin, with apparent good reason, identifies with Karakorum, is the place called in D'Anville's map Talarho Hara Palhassoun (*i.e.* Kara Balghassun), and is precisely that which Abel Rémusat, fifty years ago, pointed out* as in all probability the representative of Karakorum, standing, according to the Jesuit tables, in 47° 32′ 24″ N. latitude, and in longitude 13° 21′ 30″ west of Pekin.

The first thing that meets one on taking up the elucidation of this account is a puzzle. All the modern maps at hand, except that in M. Pauthier's Marco Polo, indicate as the site of Karakorum a position more than three quarters of a degree further south than this pointed out by Rémusat, and so much nearer the sources of the Orkhon River. Indeed, in the map by Mr. K. Johnston, junior, attached to the report of Mr. Ney Elias's Journey in Mongolia, in the new volume (xliii.) of the *J. R. G. S.*, this site is marked as Rémusat's Karakorum. What is the origin of this indication? Rémusat's it surely is not.

Mr. Paderin unfortunately made no observation, and is stated by the editor of the *Bulletin* merely to have represented his route on a small sketch without scale, and in the itinerary which we give below.† We are, therefore, still dependent for the approximate position of the ruins upon the Jesuits and their copyists, *i.e.*, I believe, all who have mapped this tract, unvisited since their day, down to the present time. I have tried to lay down Mr. Paderin's itinerary in the accompanying sketch map, based on Mr. Keith Johnston's map above mentioned, and then modified in the rough, where such modification seemed absolutely demanded by the terms of the itinerary.*

Mr. Paderin states that his route from Urga to Uliussutai bore nearly due west throughout, deviating to south-west only at the commencement. It led him across the rivers Tola, Karukha (Karoa Pira of D'Anville), the two Tamirs, and the Chilutu, then crossed the pass over the watershed which divides the basin of the Selenga from that of the Dzungarian lakes. On descending from this pass he soon fell into the Chinese official track to Uliussutai.

His attention was especially directed to the identification of the site of Karakorum. He cites as aids to this determination, in addition to the data collected in Rémusat's paper, and in Ritter, the journey of the Taos-se Doctor Khieu, surnamed Chang-Chun, who, in the year 1222, travelled from North China to Tokharistan, on the summons of the great Chinghiz, passing by Karakorum or its immediate vicinity, and the itinerary of another Chinese traveller whose name the Russian writes as Chjan-de-Khoi, and which appears to afford important data on the subject in hand.†

Among these data are the following: (1) That Khorin (Holin) or Karakorum, is more than 100 *li* to the south-west of the lake Ugei-Nor; this being a lake of clear water about 70 *li* in circuit. (2) That Holin stands in a valley which has a circumference of 100 *li*, surrounded by hills, and the river Khorin running through the middle of it. (3) That in going from Holin to the river Tamir the traveller passes a hill called "Horse's Head" (in Chinese Ma-tu, in Mongol Morin-tologoi), and another called "Red-Ear" (in Chinese Khun-er, in Mongol Ulan-chihi). (4) That to the north of Holin or Khorin there was a palace near a lake called Tsagan-Gegen.

It was not to be expected that important remains should be found belonging to the time of Chinghiz and the early khans; for the place was re-established and occupied by their descendants after their expulsion from China in 1368,‡ besides having been

* *Mém de l'Acad R. des Inscript*, tom. vii. (1824), pp. 253, 289.

† Itinerary.

		Versts.
1	Urga to Nighthalt W.	25
2	,, ,, S.W.	25
3	,, ,, S.W.	27
4	,, ,, W.	36
5	,, ,, W.	37
6	,, ,, W.	30
7	Crosses R. Tola to Chintologoi	17
8	Khadassan	28
9	Crosses R. Kharukha	32
10	,, ,,	30
11	Lake Ugei-nor	42
12	Crosses R. Orkhon	25
13	,, W.N.W.	23
14	Crosses South Tamir	16
15	Ulan Ikhi on left bank of N. Tamir	26
16	On left bank of Tamirat	23
17	Near Kuren	20
18	On R. Khanui	40
19	On affluent of R. Chilutu	34
20	On R. Chilutu	45
21	Near the Pass (over the watershed)	33
22	On R. Jak...	26
23	On R. Shara-ussu	35
24	,, ,,	24
25	,, ,,	23
26	,, ,,	26
27	On R. Buyantu	29
28	W.N.W. ,,	23
29	,, ,,	18
30	(Kuren)	28
31	Uliussutai...	18
		*864

* 864 versts = to about 576 miles.

* I have also had before me Petermann's map of W. Mongolia, based on Veniukoff (*Mittheil.*, 1872, No. ix). There is a curious error in this map; accidental, I presume. This is the misplacement by 1° of latitude of the place (a famous monastery) called, in D'Anville's map, Erdeni tchao. A chance reference in Mr. Paderin's letter shows Erdeni tchao as 2½ stages *south* of Kara Balghassun, *i.e.* corroborates D'Anville.

† Mr. Paderin quotes Chang-chun from a Russian version by the Archimandrite Palladius, in the *Transactions of the Russian Mission at Peking*, vol. iv; but this is more accessible in a French version by the late M. Pauthier (in *Journal Asiatique*, s. vi., tom. ix.

The itinerary or journal of Chjan-de-Khoi is quite unknown to me. It has been translated into Russian by the same learned churchman in the publication of the Siberian Section of the Imperial Geographical Society. I beg to draw the attention of Mr. Delmar Morgan, or some other Russian scholar, to this paper, as probably well worthy of translation.

‡ The Emperor Shunti or Togon-Temur when expelled from Peking in 1368, established himself at a town which he called Bars Khotan ("Tiger Town"), on the Kerulan River, and died in 1370. His son, Ayurshiri Dala, transferred his residence to Holin or Karakorum (*Timkowski's Travels*, ii., 208).

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exposed to destructive vicissitudes, so that nothing could reasonably be looked for, but the determination of the site from geographical and topographical data, and perhaps remains of stone ramparts.

Mr. Paderin, during his stay at Urga, had been able to get satisfactory assurance that the names Kara-Balghassun, Ugei-Nor, Morin-tologoi, Ulan-chihi, and Tamir, were all yet extant.

Near his seventh station, Chin-tologoi, there is the trace of a quadrangular rampart, grass-grown, and without other visible remains. This is pointed out by the Mongols as a work of vast antiquity.

On the ninth day's march, between Khadassan and the river Karukha, there is also a group of ruins called Khityin Khărăm, or the "Monastery Inclosure," which has been ascribed by Chinese writers to the Khitans. The Mongols could say nothing about it. The rampart is of earth, about 6 feet in height. The buildings are lofty, with no roofs remaining; the walls of stone, chiefly black flags, laid in a very solid manner, and cemented with loam having a small mixture of lime.

The 11th of March brought the traveller to the Ugei-Nor. This lake, about 8 miles from east to west, and a little less from north to south, lies towards the north side of a wide valley enclosed by low hills. The valley is called Toglokho Tologoi; it is some 45 to 55 miles in length from east to west, and 25 to 35 miles in breadth. The Orkhon River, fordable stirrup-deep, traverses the valley, and the lake discharges into it by a stream called Narin. The ground near the river is swampy, and west of it there is a series of saline lakes called Tsagan-Nor (White Lakes). Some willows and poplars grow on the banks of the river.

The hills forming the western boundary of the valley are called Ulintu, Obotu, and Ulan Khoshu. On the south and south-east are the Khadamtu Hills, sprinkled with clumps of trees having leaves like pines. The hills on the east and north are insignificant, only one having a name, viz., Khityin-Khada, "Monastery Hill." This is so called from a *kuren* or fortified enclosure at the north-west end of the lake Ugei-Nor containing a Buddhist temple, the residence of the Khutuktu Orombyin Gegen. This little *kuren* is of remarkable construction, and looks as if it might have been the palace of a khan in days of yore. The basement of the temple, both in materials and in style, resembles the ruins near the river Karukha mentioned above.

Mr. Paderin diverged from the post track at Ugei-Nor station to visit the ruins of Kara Khărăm or Kara Balghassun (for it is known by both names), and rejoined the track at the next station westward, called Ulan-Khoshu.

Four hours' smart riding, estimated at 35 to 40 miles, brought him to the ruins, lying in the same valley,* and some 4 or 5 miles from the west bank of the Orkhon, with a fine grassy plain intervening, which, in places, rises into frequent hillocks. The remains consist of a rampart enclosing a quadrangular area of about 500 paces to the side, and still retaining traces of indented battlements. The rampart is of mud, and in some places apparently of sun-dried brick. Inside the area, on the eastern side, is a tower or mound rising above the wall; the general height of the latter being about 9 feet. There are traces of a small inner rampart running parallel to the north and south sides of the square. Besides these there were to be seen no monuments or relics of antiquity.

Mongol traditions, Mr. Paderin observes, rarely preserve any memory of ancient times. They do not in general go beyond a vague statement that such a spot contains the bones or the treasure of Gesser Khan (as is commonly said of the tumuli scattered over the southern Kalkha country); or that such another is the relic of a fine monastery, or of the palace of Chinghiz Khan. Of this place, the Mongols, with Mr. Paderin, could only say that it was very old, and that probably Chinghiz Khan had lived there; but one sharp Lama came forward saying it was the city of Togon Temur Khan. Now it is a fact (already alluded to) that at least the son of this last of the Chinghizide emperors, did, shortly after their expulsion from Cambaluc, establish himself at Karakorum.

But the dimensions, distances, geographical position, and aspect correspond with the old data. Thus the place does lie southward of the Ugei-Nor from 100 to 120 *li*;* the traveller leaving it for the westward does cross a river (indeed two rivers) called Tamir, and on his way to that river does pass hills called Horse's Head and Red Ear. It answers all the looser conditions collected by Abel-Rémusat (see *Ocean Highways* for July, 1873, p. 170); the most definite tradition met with by Mr. Paderin connected it with Togon-Temur Khan; and the place is still known as Kara Balghassun (Black Town) and Kara Khărăm† (Black Rampart), both which seem to involve memories of the ancient and proper name.

Mr. Paderin supposes the old name Karakorum to have been merely a corruption of Kara Khărăm with the meaning just given.‡ But the Archimandrite Palladius, probably the best authority, in a short appended note, does not assent to this, observing that in the transcription of the Mongol text of the biography of Ogodai Khan the name of the city is rendered Khara Khorum,§ whilst the Chinese authors of the Mongol period are unanimous that the chief *ordu* of the Mongol khans got its name from the nearest river.‖ On the other hand, Kara Khărăm, or Black Rampart, is evidently applicable, in that form, only to the deserted site.

Though the character, as well as the site, of the

* The original translation says "nearly in the south-east end of the valley." This is a little difficult to reconcile with the other indications, including the Chinese notices and the Jesuit map. But in another passage also the traveller says he rode from Ugei-Nor to the ruins nearly south-south-east, so I have tried to accommodate the sketch map to this.

* The Chinese traveller quoted by Mr. Paderin says south-west indeed, whilst *he* says south-south-east, as we have already noted.

† The transcription from the Russian is Kherem. But I presume that, as often in French spelling, the *e* here represents the neutral vowel—the short *a* in Americă.

‡ A similar suggestion is made by Mr. Ney Elias, *J.R.G.S.*, xliii., p. 122.

§ As in the Western Asiatic writers, *e.g.*, Rashiduddin and Ibn Batuta.

‖ See *Ocean Highways*, as quoted above. My remarks there are thus corroborated. But I have found a passage which may be the origin of Mr. Grant and Sir H. Rawlinson's association of the name of Karakorum with mountains. D'Ohsson cites from Rashiduddin a passage which speaks of "the great Altai and the Karakorum Mountains." And M. d'Avezac, just after quoting this, assumes that the town was called so from being at the foot of the Karakorum Mountains. (*Rec. de Voyages, &c.*, tom. iv., pp. 518, 519.)

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remaining rampart appears to correspond with that of ancient Karakorum ("about a quarter to one-third of a mile square, enclosed by a mud rampart" *), it is not to be supposed that this existing wall, with still surviving traces of battlements in sun-dried brick, can be the work of Chinghiz, or Ogodai, his son. It is, *at earliest*, the work of the son of Togontemur (1370-1378), and, perhaps, may be later still. For, during the Ming dynasty (1368-1644), the Chinese had less power over, and fewer dealings with, the nations beyond the wall than at almost any other period, and hence less knowledge of their history; so that it has been observed that, "one sees with surprise that the recorded history of the Hiongnu, at the time of the Han dynasty, before the birth of Christ, is much better digested, and appears infinitely richer in events than the later history of the Mongols, from their being driven out of China down to the first half of the seventeenth century." † The history of this period is likewise meagre and confused in the hands of Sanang Setzen, the Mongol prince, but in his book we find three brief allusions to Karakorum.

In 1399 the fourth of the successors of Togon-Temur, called by Sanang Setzen, Elbek Khan, was put to death by Ugetchi Khashagha of the Kirghiz, claiming the headship of the great confederacy of the Oirad, and this chief at the same time reduced the Mongols to subjection, a subjection which lasted many years. Elbek Khan's chief wife passed into the conqueror's tents, and three months afterwards bore a son, called Adsai, whom the Kirghiz chief brought up as his own. At the same time a great Mongol chief, Batula Chingsang, had captured a prince of the Assod, made him a slave, and set him to gather dry *argols* on the steppe. One day there had been a great Diet of the Oirad, and as some of the members rode home from it, they came upon Aroktai ("the Basket-man"), as the slave prince was scornfully called, toiling at his usual occupation. As they passed he called to them and asked what business had been done in the Diet that day. One of them answered jeeringly—"It has been resolved *to build anew the city of Khorum-Khan*, to put Prince Adsai on the throne of the Khans, and make the lad Aroktai a prince." When they had passed on, the slave threw away his basket and said—"Those were no words of thine; they are the decrees of God," ‡ &c.

At a much later date (1552), we are told that Altan Khan subdued the four Oirad, "the seizers of Honing.§ And a nephew, addressing the same prince some years later (1576), is made to say—"Thou hast avenged thyself on the Chinese, the conquerors of thy capital, and by binding the Chinese people to thy policy, has made them thy dependants; thou hast also avenged thyself on the Oirad, the conquerors of Honing, subdued their people, and brought them under thy rule."

There seems to be no doubt that Khorum-Khan in the first extract (preserving a part of the old name), and Honing in the other two (a reflection from the Chinese Holin) both stand for Karakorum. We see from the first passage (if it be historical), that in 1399 the city was abandoned, perhaps, however, only through the recent conquest by the Oirad. We do not see in the other allusions any positive intimation of its occupation at a later date, but neither is there anything absolutely inconsistent with that possibility, and we may even say that the double allusion to the Oirad as the conquerors of the city, seems likely to bear reference to events that were not a century and a half gone by.

H. YULE.

* *Ocean Highways* for July, 1873, p. 170.
† Schmidt (Sanang Setzen), p. 402.
‡ Schmidt, p. 145-147.
§ Ibid, p. 216.

THE KASHGAR MISSION.

THE progress of the Mission up to their arrival at Kashgar, has been noticed in previous numbers. We have now been favoured with the following notes, written by Lieutenant-Colonel T. E. Gordon and Captain Biddulph on the subsequent doings of the party, which include visits to the Chatir Kul Lake and Maralbaski, and the crossing of the Pamir plateau. Lieut.-Colonel Gordon writes as follows, under date of January last:—

"Dr. Stoliczka, Captain Trotter, and I left Yangi-shahr-Kashgar, on the last day of the old year. Having been asked to take as little baggage as possible, the local authorities undertaking to provide us with lodging and food, the party started with the limited following of six servants and six baggage ponies. The first day's journey was to Besakh (26 miles), a village in Upper Artush, where quarters were found for us in the house of a Kirghiz Bai (Beg-Patriarch.) The road lay in a northerly direction, round the east side of the city of Kashgar, then through about 3 miles of cultivation to a stony desert rising gently towards a dip in the low range of hills which shuts in the valley of the Artush, a broad and far extending fertile plain, studded with villages showing signs of thriving population and careful farming. This well irrigated valley, watered by never failing streams flowing from the Tian-Shan and Alai Mountains, must produce wonderfully rich and regular harvests. Two large camel caravans were passed going from Almati to Kashgar with Russian goods, of which iron cooking-pots formed a considerable portion.

"*January 1st*, 1874. — Proceeded in a general N.N.W. direction, 3 miles over part of the Artush Valley to the mouth of the Tagun Valley, up which the road led to the Khatai, also called (Tessiktash*) Kurawal (9 miles), a small square fort used as a customs post, and occupied by a few of the Kashgar Dadkhwah's men. This was the most advanced post of any description held by the Chinese during their occupation of Kashgaria. We halted for the night at Chung Terek (the big poplars), also called Ak-chirgh (the white reeds), 20 miles, a Kirghiz village of mud huts and felt tents. We were accommodated in a small smoke-stained "Akai," and had the usual "Ash," for a meal. Kirghiz are scattered over the whole valley in small "Akai" (hamlets), located wherever grazing is available for their herds and flocks. Most of the hamlets show signs of settled habitation in patches of cultivated and irrigated ground, probably attended to by the elders of the families when the summer move to high pasture lands takes place. The scenery at Chung Terek must be singularly beautiful in summer.

* Post.

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"*January 2nd.*—Proceeded to Chakmák, 21 miles up the Tayun Valley. The frozen Tayun was crossed and recrossed repeatedly, as on the previous day. The hills close in a short distance above Chung Terek, and at a commanding spot 12 miles beyond the Mirza (also called Terek and Post) Fort is placed. It stands on the left bank of the stream, close under a high, steep hill, surmounted by two circular redoubts. Its front is covered by similar works, built on strong positions, entirely commanding the approach, as well as two ravines, by which a desperate attempt might be made to turn them, by climbing rugged heights extremely difficult of ascent. An extended curtain (parapet loopholed wall) runs for about 400 yards up the bank of the stream, connecting the main fort with a smaller one under a height, occupied by a circular outwork, which conceals the line of parapet and secures it against enfilade fire. This work would enable the defenders to pour a tremendous flanking fire on assailants forcing a passage down the bed of the stream. The fort appears to hold accommodation for some 200 or 300 men. At present it is occupied by a small guard only. We were met here by Yuzbashi Alumkul, a Kohistanee Kipchak, sent from Chakmák to meet us. The "dastarkhwan" provided was of the old familiar style, and was most welcome to us after the previous two days' most ordinary and almost scanty fare. The valley opens out again above the Mirza Fort, but to no great extent. It affords good grazing ground to Kirghiz, scattered all over it in tent clumps. Nine miles higher up is the Chakmák Fort standing on a small open slope on the right bank of the Tayun, where it makes a sharp bend round a lofty perpendicular hill. The position occupied by the fort is walled in, and concealed by stupendous and all but inaccessible rocky mountains. The approach on both sides (front and rear) is by the narrow defile through which the Tayun flows. The fort and houses in its rear must give accommodation for a large garrison. A work high up on the left affords an effective flank defence. Three lines of fortifications, built on high, strong positions (those in front commanded from the rear), protect the approach to the defile and fort.* The precipitous rocks that tower over all, while perfectly inaccessible to assailants from the front, are capable of ascent from the rear by defenders, so that the outworks, if carried, could not be held by a fire thus opened on them from above. To all these sources of strength may be added the very important one that the position admits of attack on one point only, and that is commanded by works giving both direct and cross fire. The place is one of remarkable strength, its natural powers having been greatly increased by skilfully placed works and well selected defensive lines. The fort is said to have been built four years ago by Akula Beg, the eldest son of the Amîr. Stone and mud form the building material. It has a garrison of about 200 men. The gun-shed contained four guns (two howitzers and two long pieces of small calibre) on wheeled carriages. No other artillery was seen. 500 good soldiers under a determined leader could hold the place against a vastly superior force. Mahmood Beg, Toksabai (chief of the standard), in command, welcomed us warmly, and treated us most hospitably, accommodating and entertaining us in excellent quarters inside the fort.

"*January 3rd.*—Continued in the same general direction, passing the Suyuk Kurawal, 8 miles up the Tayun, where it is joined by the Suyuk stream, flowing south-east from the Suyuk Pass, distant about two days' journey, and said to be impracticable for horses in winter. The Kurawal is held by a small guard. The valley opens out a few miles above Chakmák, and near Suyuk the hills become rounded and low. We proceeded up the Tayun almost due north from Suyuk, and halted at Goobja Bashi * (the Ovis Poli ground), also called Bulghum Bashi (the Myricaria wood), a sheltered valley with abundant pasturage. We were accommodated in a capital "Akai," sent by the "Toksabai." Our accompanying party of Kashgar officials, of whom the Meerakhor Inam Khaja is the principal, was joined at Chakmák by the Yuzbashis, Muhammad Alim and Alum Kul, and by the Kirghiz Yuzbashi, Muhammad Saleh, with ten of his men. Muhammad Saleh is an Andijani Kirghiz, with 100 Chirik, Alai, and Andijani Kirghiz under him, performing military service in the Chakmák command. I was told that the Amîr employs Kirghiz to a considerable extent in the frontier commands.

"*January 4th.*—To Torugat Bela (the brown horse's back), 16 miles, a grassy plain 13 miles from the Torugat Pass. At about 5 miles the road passes through an old crater, which was pointed out by Dr. Stoliczka as verifying his previously expressed opinion as to the existence of an old volcano in this direction. On leaving the road and wandering over the grass-covered undulating hills and long sloping flats to the west, we saw several flocks of Ovis Poli, the coveted game of Indian hill-sportsmen, but were not fortunate enough to secure any. The Torgurat Bela ground was occupied by Kara Kirghiz and Kazaks from Nayrn with great droves of ponies, but they were moved to a valley in the neigbourhood to make way for us. We saw about 800 of their horses being driven off as we reached camp.

"*January 5th.*—Halt. The Ovis Poli ground was visited. Large flocks were seen, but none were bagged by us. We went about 12 miles to the west, passing along extensive valleys and over flat-topped spurs and rounded hills all covered with grass—good riding ground. The country to the east of the pass appears of the same character.† The pasture, even now in the depth of winter, is excellent, dry but nutritious, as shown by the condition of the ponies which feed entirely on it. In summer it must be very rich and abundant. We can now form some idea of the nature and pasture of the Pamir Steppes. We were told in the evening by the Meerakhor Inam Khoja that the arrangements would only admit of another day's stay here before returning to Chakmák, and we were offered the choice of a successful day after Ovis Poli on new undisturbed ground to the east, or a visit to the Chatir Kul (Sheet Lake) by riding there and back. We decided on the latter, hoping to have other opportunities of Gulja (Ovis Poli) sport. On our way back to camp the Kirghiz were despatched in several

* The fort extends right across the open space to the edge of the stream, and sweeps with its fire the whole of the inner approach.

* Ten miles from Chakmák.

† Laden animals can pass from Torugat Bela to the foot of the Terek Pass, 25 or 30 miles to the east by path over the pasture grounds.

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directions, and brought in two fine male and one female Ovis Poli.

"*January 6th.*—Rode to Chatir Kul and back, 32 miles. Crossed the pass, 13 miles, and passed on to a ridge 3 miles beyond, from which a splendid view of the lake, plateau, and surrounding mountains was obtained. The day, fortunately, was remarkably clear. There was no snow on the southern side, and very little on the northern side of the pass. The lake was entirely frozen over and thinly covered with snow. A considerable amount of snow lay on the Tash-Robat range and the mountains to the west. The Tash-Robat Pass, leading to Naryn (three days' march from Chatir Kul) was, however, perfectly open, as we met four or five travellers who had crossed the previous day, and halted for the night at Chatir Kul. Several small parties of Kazaks and Kara Kirghiz were seen on the Torugat Pass attending their ponies grazing on the slopes. The Kirghiz Yuzbashi who accompanied us, appeared to be on the best terms possible with them all. We were told that the Naryn Kazaks and Kara Kirghiz come over annually with about 5000 ponies for winter pasture in the Amîr's territories, paying revenue to His Highness. The ponies are stout and well made. Both they and the men look enduring and active, and they must be hardy to a degree to stand as they do the cold of these heights. In the sheltered Torugat Bela ground the thermometer last night sank to 26° below zero outside and 8½° below zero inside our "Akai." The wind at this season on the heights is cutting in the extreme. Of this one of our party had very uncomfortable proof on the 4th, when in his intense eagerness to be the envied 'first' to bag an Ovis Poli, he undertook a long 'stalk' round the summit of a ridge about 14,000 feet high, and was frost bitten in two fingers from contact with the rifle barrel before he got a shot. The Kashgar officials assert that the Tash-Robat range (the crest of the Tian-Shan) is the boundary between the Russian and Kashgar territories. Ihrar Khan Tora told me this the day I left Kashgar, and Syud Yakoob Khan Tora appears to have spoken in Calcutta of the Naryn stream being the boundary. Russian accounts, however, speak of the Chatir Kul as 'on the borders of Russia and Eastern Turkistan,' and even make mention of the frontier line 'along the southern spurs of the Celestial Mountains.' From what we heard on the spot we are inclined to believe that practically the Torugat Pass range is the boundary, *i.e.*, the southern spurs of the Tian-Shan. In the whole way from Kashgar there is literally no 'hill ascent' till within a few hundred yards of the summit of the pass, and there it is easy and gradual. The road is well adapted for the passage of an army at all seasons of the year. There is nothing to prevent field-guns and waggons traversing it beyond the slight obstacles that are to be met with in many country roads, and which, with the aid of sappers and labourers, can be easily and quickly removed or remedied. Grass is to be got throughout, being particularly abundant between Chakmák and the pass. There is no scarcity of firewood to within 25 miles of the pass, and then a good substitute is always obtainable in the stunted furze and dry horse-droppings to be found in the water-courses and on the pasture grounds. Baron Kaulbars in his description of the road makes a strange error in saying that for 67 miles from Chatir Kul towards Kashgar no fodder is procurable.

"*January 7th.*—Returned to the Chakmák Fort, 26 miles. On the way we saw Kirghiz loading camels with large blocks of ice cut in the Tayun for transport up a side valley, where they were located with their flocks, their supply of water being thus obtained till the approach of warm weather releases the frost-bound springs.

"*January 8th.*—Halted at Chakmák to make arrangements for a journey across to the Terek Forts on the other road—to the east, from Kashgar to Naryn and Almati *viâ* Artush—the Terek Pass on the southern slope, and the Terekty Pass on the main crest (east of the Tash-Robat Pass) of the Tian-Shan. There is a road of communication between the Chakmák and Terek Forts, about 25 miles, with a small fort half way. Mention was made of a small fort among the hills to the west, between Chakmák and the Mirza Kurgan, held by Kirghiz. A road branches off about half way between Chung Terek and the Khatai Kurawal (17 miles or so from the Mirza Fort), and communicates with the forts on the Kashgar-Khokan road. We could not induce the Chakmák Toksabai to arrange for our visit to Tora Khoja's command. Tora Khoja is the Toksabai of the forts on the other road and pass leading to Naryn and Almati. We were told that no instructions had been received from Kashgar, and that it would be necessary to return there for further permission to visit Terek or other places. We were shown at Chakmák the frozen carcases of about 50 Ovis Poli and Ibex, stored for the winter meat supply. The Toksabai presented us with nine splendid male specimens. All had been shot by the Kirghiz troops, who, judging from what we saw of the party that accompanied us, must form very valuable auxiliaries in mountain warfare in these regions. Mounted on powerful and active ponies, peculiarly well adapted by natural training to continued hard work and great exposure, these Kirghiz, equally accustomed to a rough life, are admirably fitted for 'scouting' and mounted infantry purposes. They are armed with rifled matchlocks, which they use most effectively, and manage to load wonderfully quick.

"*January 9th.*—Proceeded to Chung Terek, 21 miles, on our way back to Kashgar.

"*January 10th.*—To Kairak, 25 miles, a large village in the Artush Valley.

"*January 11th.*—To Kashgar, Yangi-shahr, 21 miles. Notwithstanding the intensity of the cold during the trip, Captain Trotter, R.E., succeeded in making a complete route survey of the road, checking it by astronomical observations. He also took hypsometrical observations for the heights. Dr. Stoliczka took the fullest advantage of all the opportunities afforded for geological research and examination, the results of which he has recorded. I made a few sketches. We were invariably well received by the soldiers and others whom we met during the journey, always getting a ready salutation of friendly respect from all. I have alluded to the Terek Pass, on the road between Kashgar and Naryn-Almati. The pass of that name has long been known to geographers as leading towards Khokan. We found 'Terek' to be a name in common use in the direction we travelled. On the road to Chatir Kul we passed Kichak Terek, Chung Terek, and Terek Kurgan, and were told by all from whom we enquired, that the forts on the other road from Kashgar to Almati are called Terek, also that

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the pass leading over the southern crest of the Tian-Shan is similarly named. Baron Osten-Sacken, in his account of the Trans-Naryn country, speaks of the 'Terek,' a tributary of the Naryn stream. As thus applied in naming places, silver or white poplar is evidently the meaning of the word, which has also other significations. There are small poplars at Kichak (little) Terek, and large ones at Chung (big) Terek, and that tree is the most common one in the Tayun Valley. Baron Osten-Sacken mentions the banks of the Terek being 'wooded with poplar.' The tree is probably common towards the Terek Forts and on the Khokan road. I go into these particulars with reference to a question raised in a discussion on Central Asian geography, given in the Royal Geographical Society's *Proceedings*, dated 25th of April, 1870, as to the existence of a Terek Pass north of Kashgar, as well as one to the west.

"KASHGAR, *24th January*, 1874."

Letters have been received detailing the subsequent progress of the Mission; but as we cannot give these *in extenso*, we must furnish our readers with the following extracts. Captain Biddulph writes as follows respecting his trip to Maralbashee:—

"KASHGAR, *4th February*, 1874.

"The Amîr's permission for, my going to Maral-bashee having been obtained, I left Yangi Shahr on 31st December, 1873, Mirza Suffee Punjabashee being deputed by the Amir to accompany me.

"Travelling easily, I reached Malabashee in seven marches. The road runs for the entire distance along the course of the Kashgar River, or Kizil Su, which it crosses about 60 miles from Yangi Shahr. For the first 40 miles the country is well cultivated, and there is no want of population; the town of Fyzabad, which gives its name to a flourishing district, being reached at 35 miles' distance from Kashgar.

"At a little more than half-way from Yangi Shahr to Fyzabad, the road crosses three considerable streams flowing from the south into the Kizil River. Their names were given me as the Derbuchek, the Chokanah, and the Fyzabad, and I was told that they are all united into one stream, called the Yamanyar, at no great distance above where I crossed them. Beyond Fyzabad, habitations become scarcer, and cease altogether at Yangi Awat, 46 miles from Kashgar. From here the country is covered with low bush-jungle and sand-hills, gradually changing to forest, which becomes continuous shortly after crossing the Kizil Su to within 4 miles of Maralbashee. No habitations are met with during the whole of this distance, except posthouses, at intervals of about 15 miles, which are erected for the use of travellers. These are all of inferior construction, with small accommodation, one of them only consisting of a single room. As I took no tents with me, I used the post-houses during the whole time of my absence from Yangi Shahr. The forest, though apparently of great extent, contains no fine timber, the only tree being the poplar (*Tograk*), of stunted growth; the under-growth consisting of a bush, growing to a height of about 8 feet, a thorny bramble, and camel thorn, but there is no grass; the soil is very dry, alluvial, and covered with a thin hard crust of soda, which crackles under the foot at every step, and in which horses sink up to the fetlocks. The forest abounds with gazelles (*Antilope gutturosa*) and hares, but, with these exceptions, is singularly wanting in animal life. For a space of about three-quarters of a mile on each side of the river there are no trees, but in their stead a belt of thick high grass, like what is known in Indian jungles as hurkut, growing to a height of from 8 to 12 feet. In this are tigers, wolves, the large deer, called by the natives 'Bugha' or 'Maral' (apparently *Cervus elephas*), gazelles, foxes, and pheasants. This treeless belt is doubtless caused by periodical changes of the river bed, of which there are many evidences; the fall of the country to the eastward being only a little over 500 feet in 100 miles, according to aneroid readings, which I took daily, the river making frequent turns and windings, and being level with its banks, so that a very slight flush of water would cause an overflow—the current not being rapid enough to prevent its freezing sufficiently to admit of loaded carts crossing it with ease. In summer it is crossed by a bridge, which, however, I did not see, as the road I followed, both in coming and going, is more direct, thereby saving several miles, and is always used in winter. Within 4 miles of Maralbashee the forest ceases, and the country is covered with long grass, with occasional patches of scrub and swamp, much resembling the Rohilcund Terai. In this are dotted about small villages, with patches of cultivation round them. The grass jungle extends over a great extent of country, as well as I could gather, both to the north-east, south-west, and eastward, being, doubtless, formed by overflows and changes of course of the Kizil and Yarkand Rivers. The latter river, I was informed, flows close to Aksakmaral, which is about 32 miles south-west of Maralbashee.

"Maralbashee, or Burchuk, as it is sometimes called, contains about 1500 inhabitants, and is at the junction of the road from Yarkand with the Kashgar and Aksu road. It contains a fort and small garrison of about 200 men; it could, however, from its position, be easily and quickly reinforced, either from Aksu, Kashgar, or Yarkand, if necessary. The river Kizil flows under the walls of the fort, and, during the late rebellion against the Chinese, was made use of by being dammed up and turned on to the fort to break down the wall. Where I crossed it on the road from Kashgar it is 100 feet wide, level with the bank, but flows here in a greatly diminished stream, about 25 feet wide, between high banks, 20 feet below the level of the surrounding country. Its character was so altered, that it was only after repeated assurances from the natives that I satisfied myself as to its being the same stream.

"The Hakim Beg, of Maralbashee district, has the title of Dadkhwah: the present one, by name Ata Bai, is an Andijani. He is a man of about 35 years of age, with especially pleasant address, and seems much liked by the people, who all speak highly of him.

"The natives of the district are called Dolans: they have a more Tartar-like cast of countenance than Yarkandees and Kashgarees, and are said to be distinguished for their fondness for music and singing. They are said to be descendants of prisoners brought in the 4th century of the Hejra by Harown Bugra Khan from Mowralnahr, and forcibly settled in the country between Maralbashee and Kuchar. In the

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jungle villages they excavate houses out of the ground, making grass roofs level with the surface. The term Dolan is applied generally to men of mixed parentage.

"The fort is of the same kind as others we have seen in the country, with earthen ramparts, about 30 feet thick and 25 feet high, a low parapet, forming a kind of covered way, and ditch: it forms a square of about 170 yards, with projecting circular bastions at the angles, three of them having square towers on them; also a circular bastion in the centre of each face. Close outside the fort is a palace lately built by the Amir.

"Nine miles to the north-east of Maralbashee is a huge black rock, with treble peak, rising to a height of some 2500 feet above the plain, apparently basaltic: it is very rugged and quite inaccessible, and forms a conspicuous landmark. It is called 'Pir Shereh Kuddam Moortaza Ali Tagh.' At its foot on the north side is a Mazar of great sanctity. The Aksu road runs within a mile of it, and travellers, on catching sight of the shrine, dismount and say a prayer.

"Four days after my arrival at Maralbashee, the Dadkhwah Ata Bai came in from Orumchi, after an absence of ten months: he had with him about 120 men, and had been present at the recent fighting at Manass. I was told that a great number of desertions had taken place from the army: upwards of 400 men, it was said, had deserted into Russian territory. Of the contingent from Maralbashee, four had been killed and twenty had deserted.

"From Maralbashee I went to Charwagh, the first stage on the Asku road, a village of about 250 inhabitants, and spent several days in shooting and hawking. I was especially anxious to shoot a tiger, of which there are many about, but was unsuccessful in the sea of high grass with which the country is covered. From signs which I was shown, and footprints which are common everywhere, and judging by what I was told, there is no doubt that the tiger here is altogether a smaller animal than his Indian congener; he seems also to differ considerably in his habits, prowling round villages at night, killing dogs and sheep, and behaving more like an Indian panther than a tiger. The natives spoke of men being killed by tigers occasionally; but it does not appear to be a common occurrence.

"The jungle abounds with pheasants, which gave good sport with hawks; and I also saw the burgoots, or trained eagles, kill gazelles and foxes. I was not fortunate enough to see a wolf killed by them; but from the great ease with which an eagle disposes of a full-grown fox, I could see that a wolf would have no better chance.

"Grasping with one powerful talon the throat of his victim, the burgoot seizes his jaws with the other, keeping them closed with an iron grasp, so that the animal is powerless.

"Gazelles are seized in the same way, except those with horns, in which case the eagle first fastens on to the loins of the animal, and watching his opportunity, transfers his grasp to the throat, avoiding the horns. It is a fine sight to see the great birds sweeping up to their prey.

"I saw at Maralbashee a Punjabee, serving as a soldier, who gave me much interesting information, which I have recorded elsewhere. The country round Maralbashee is well watered, and the soil rich, and seems only to want population. There are many traces of old cultivation now overgrown with jungle.

"I left Charwagh on the 16th, and returned to Kashgar on the 23rd January by the same road which I went by. I was invited to go further along the Aksu road, and believe that no difficulty would have been made about my going to Aksu itself, as during the whole time I was absent from Kashgar no attempt was made in any way to control or direct my movements. I received whatever supplies I was in need of, and was treated by all officials with the greatest civility. On one occasion a Moolla, having forced his way into my room and asked me for a turban, was severely punished by the Governor."

The following extracts from a further letter of Captain Biddulph's, furnish an interesting account of the journey over the Pamir:—

"KILA PUNJA WAKHAN, *April 14th*, 1874.

"This, if it reaches you at all, will arrive considerably before the letters I have written to you from Kashgar, so I will recapitulate our movements. We left Kashgar on the 17th of March, and after two days at Yangi Hissar, Gordon, Trotter, Stoliczka, and self, came on here, and arrived yesterday. We had an uncommonly rough time of it, having been travelling in snow, with bad weather, from the day of leaving till now. The cold was not so severe as on the Karakorum; but the great amount of snow creates much discomfort, and cuts our faces about tremendously.

"We came through Sirikol, Tashkurgan, to Aktash, and over the Little Pamir, by the lake marked on the map as Burkut Yassin, though the name is a pure invention. The Pamir is not, as far as we can gather, a great steppe which can be traversed in any direction, but consists of a series of broad, elevated valleys, along which the different routes run. The way we came is the winter route, the elevation being 13,000 feet; but we had to cross four passes between Yangi Hissar before getting on to the Pamir. It appears that the drainage of the Pamir is all to the west, the Pamir itself not being the true watershed, but the Kizilyart Plain, extending from north of Tashkurgan to the Alai, belonging to the Amîr of Kashgar. We have also solved the drainage of the Karakul, which has hitherto been a favourite subject of geographical discussion. There are two Karakuls, one draining east and one west. The most important geographical fact we have ascertained, though, is that the uninhabited parts we have come over, instead of belonging to nobody, are the property of the Mir of Wakhan, our present host, whose boundary marches with that of the Amîr of Kashgar.

"All supplies were brought with us, sent by the Amîr, whose liberality all through has been unbounded. We had sent on Mahomed Afzul ahead of us to announce our coming, and found Mir Futteh, Ali Shah's son, ready to meet us at the first village. Of course they had not expected us, and were in a great state at our coming; but finding that we wish to pay our way, and will not eat them up, they were more satisfied; but you can hardly imagine a more miserable country—there are not more than a thousand inhabitants, and the climate is so severe that for five months they never go out of their houses, except to collect firewood. Luckily, the Mir of this place is very civil, and gives us all we want, or we might

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be in a fix, as our animals are so broken down that they require a fortnight's rest before we can face the Pamir. We hope to go back over the Great Pamir by Wood's Lake; but they tell us it is impossible on account of the snow, of which more has fallen this year than usual, so we are sending two men to see. These tributaries of Shere Ali's are very independent fellows. Futteh Ali Shah is a very feeble old man, very ill, and just now much oppressed by a debt of 400 Rs., for which he has an inexorable creditor living on him. We are thinking of paying off the national debt and thereby earning eternal gratitude. The people are peaceable and Gurreeb, and have a great respect for the Dowlut (English Government). We have just got a despatch from Cabul, written, of course, before they knew of our leaving Kashgar, and are sorry to find that there is no chance of our going back that way; so we shall load up and start back for Yarkand, across the Great Pamir by Wood's Lake, but shall require ten days here first to repair damages and prepare for the journey, as our cattle have suffered considerably, and the Great Pamir is 2000 feet higher than the little one.

"We have got some rather important information about the geography of these parts. The uninhabited tract that we have just traversed, instead of being a 'no man's land' as had always been imagined, belongs to the Mir of Wakhan, who joins hands with the Amir of Kashgar, within two marches of Sirikol. This is also acknowledged in Kashgar, and is a well-known fact to travellers and others, and there seems no doubt about it. The real watershed between the east and west is the Kizilyart Plain, which belongs to Kashgar. I send you a rough map, which will show you how the rivers run, quite differently to what has been hitherto accepted; the proportions are a little out, but otherwise it will give you a good idea of boundaries, &c. The Pamir, instead of being a steppe which you can march across in any direction, consists, as far as we can make out, of a series of broad valleys at a great elevation, called by the names of different Pamirs, along which the different roads run. The whole way from Aktash to Sarkud, four days' march, we were in one broad valley, there being no perceptible rise between the lake and the commencement of the waters flowing west. We saw great herds of Ovis Poli, and at every step their gigantic horns were sticking up out of the snow, but there was no possibility of stopping to shoot, and our marches were so long that we were obliged to start our baggage-animals off before light, and they effectually frightened all the game off the road. There are no yak on the Pamir, but there are bears, quantities of wolves, and a black kind of ibex.

"By-the-bye we found an Englishman in Kashgar: he was always hanging about our Elchekhana, and we noticed him and suspected him of being an Englishman from the first; but he called himself a Nogai Tartar, and said he had been in Russian service. The day we left he took service with us as a mule-driver, and at Yangi Hissar, Gordon caught him reading out of his book while he was sketching, and taxed him with being an Englishman, on which he bolted and was seen no more. The poor wretch is probably a Crimean deserter."

LAND COMMUNICATION BETWEEN EUROPE AND CHINA.*

THE completion of the railroad across North America first suggested the idea of more direct communication between Europe and China, the chief consuming and producing countries of the world. In considering the question in detail, the object to be sought is of course the utilization of existing trade-routes in combination with existing lines of railway, and two projects have thus grown up which it is desirable to consider a little at length.

The Russian project starts from Nijni-Novgorod as the terminus, and runs by way of Tiumen to the foot of the Ural Mountains, past Omsk, Tomsk, Irkutsk to Kiachta, whence it crosses the desert to Peking. But it has many manifest disadvantages. The proposal involves the union of about the furthest point of the Chinese Empire with Europe, by means of a railway passing over numerous large streams, and through a thinly populated and comparatively barren country, which boasts few commercial towns and little or no produce, likely to create an intermediate trade; the bridges would be continually damaged in spring time through the breaking up of the ice; any local disturbance near the line would probably block the entire route, while along the whole length of line, and especially in Mongolia, there is a scarcity of coal.

The English projects consist in uniting the valleys of the Indus and the Ganges on the one side with Europe, and on the other with China. Inasmuch as this involves the question of direct communication with a country possessing 240,000,000 of inhabitants, and with a neighbouring kingdom of 30,000,000, it is clearly a matter of great interest and importance. We shall probably soon be in a position to judge of the practicability of the route, whether through Asia Minor and Persia or along the valley of the Amu to Peshawar. The more eastern project, however, I venture to urge may be safely set down as impracticable. The rail has at present got as far as Dacca, in the delta of the Brahmaputra. From thence it is proposed to push on either towards Sudya or Ava and Bhamo. But in either case one finds one's self in a *cul de sac*, for the nearest town situated in the plains of China is I-chang-fu on the Yang-tse, and the distance between that point and either Sudya or Bhamo is as great as from Berlin to Constantinople, while the intervening country is so mountainous that half-a-dozen St. Gothard's tunnels would have to be pierced, to say nothing of other physical difficulties.

To any one looking at the question *from a Chinese standpoint*, neither of the foregoing projects would ever by any possibility occur. The goal, to be reached, it must be remembered, is that densely-populated and fertile alluvial plain which lies beyond the eastern prolongation of the Kuen Lun range and between the lower courses of the Yang-tse and Hoang-ho. To the south of the Kuen Lun, this plain is inaccessible from Sudya and Bhamo, because both these towns lie beyond the heavy mountainous region shutting it in on the west. But in other directions this great plain extends out considerably. To the north, where the Hoang-Ho breaks out from its mountain cradle, lies the true gate towards Central Asia. There

* Paper read before the Berlin Geographical Society, 11th of April, 1874.

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is, indeed, an opening in the mountain barrier northward by Peking, but this has been already considered above, and shown to be unlikely. The real key to communication with Central Asia is the town of Si-ngan-fu which lies on a broad plain at the foot of the northern slope of the mountain range. Westward from hence a wide natural route extends straight away into Central Asia, and eastern travellers who formerly, in the days when Si-ngan-fu was the residence of the emperors, directed their gaze towards the coast or up the great Yang-tse, now instinctively turn towards the above-named route and recognizes that at once as offering the best line of approach, whether for caravans or armies, as well as the best, if not the only site for a line of communication. This belt of country, if so one may term it, leads past Lanchow-fu, through remarkably cultivated districts, which have been described by Rémusat and Carl Ritter, and in which the towns of Lan-chau-fu, Kanchow and Su-chow successively occur. To the south this belt is shut in by the lofty Kuen Lun Mountains, peopled by Mongol and Tibetan tribes, and to the north by endless steppes and deserts overrun by Oelot races. The intervening tract is narrow, but level and fertile. Hard by Su-chow it widens out, and a little beyond the last great gate (Kia-yu-kwan) the great wall is reached. There are passages in Chinese history which show that when commanding the road and its approaches, the emperors had no difficulty in keeping back all invaders from the west. While they have never striven for the dominion of the countries to the north and south of them, it has for 2000 years been their policy jealously to keep this pass, which, commercially and strategically considered, is the key to all approach from the west, and which also forms a wedge of separation between unfriendly tribes to the north and south, who, united, might at any time have proved a source of danger to the empire. No sacrifice has ever been spared to keep hold of this position, and the same policy is pursued now. The neck of the Muhammadan rebellion was never considered broken till the road to Su-chow and the Kia-yu-kwan gate were both recovered by the Chinese.* All these events go to prove the enormous importance of the route.

From the gate in the great wall the road runs for a distance of 1560 *li* towards the fruitful and fertile oasis of Hami, up to which point it is pretty level; but at no great distance from the oasis it sinks where it crosses the adjoining desert, to which, by the bye, the name of Shamo or Gobi is wrongly applied. For three days' march the road leads through a waterless desert, the perils of which have been depicted in vivid colours by some travellers, while others, strangely enough, have omitted all mention thereof. Beyond the road lies through steppes.

At Hami the great Tian-Shan range is reached, and the road bifurcates, the Tian-Shan-Nanlu road running southward from one oasis to another, past Kashgar and Yarkand, and the northern one, Tian-Shan-Pelu, leading along a steppe-like country studded with wells, past Barkul to Kuldja, the furthest point up to which the present dynasty of the Tatsin has extended its direct sway. As our readers most probably know, this town was a few years back captured by Muhammadan rebels, and, in 1872, annexed by Russia.

The trade-route from Si-ngan-fu past Hami to Kuldja is the best natural line for a railway from China to Europe. It might be satisfactory to some, did space permit, to furnish here some particulars regarding the nature of the country, as supplied to us by travellers. But the best proof of the goodness of the road, and the absence of any important physical difficulties, is that up to the time of the recent political disturbances, camels were rarely used by travellers, but waggons almost exclusively adhered to. In the town of Si-ngan-fu, a two-wheeled car, with two mules can be commonly hired, which will carry (not reckoning the driver) two persons and 700 lbs. of baggage, or 1100 lbs. without passengers. The most difficult stretch of road is apparently that between Si-ngan-fu and Lan-chau-fu, inasmuch as a lofty mountain has to be scaled; but the gradients on both sides, more especially on the west, are easy. Beyond this the road is level, and supplied with wells as far as the river I'lí, while an extra horse is not required even for the sandy tracts. A good idea of the character of the journey may be gathered from the fact that the distance from Si-ngan-fu to Kuldja is 8020 *li*, or 2245 miles, and that it can always be accomplished in eighty days, at a cost of about 12*l.* to 13*l.* for the conveyance. Nothing is gained, but on the contrary difficulties are encountered, by deviating from the road. A railway could, it is true, be laid from Hami to Yarkand, a distance of 1335 miles, but Yarkand is situated in a regular *cul-de-sac*, being perfectly inaccessible from the north, west, and south.

The advantages of this route over all others are manifest. It is the most direct line of communication between China and Europe, and it enters China Proper at the only point where a good road exists from the westward. Such difficulties as arise from broken and mountainous country are (as unanimous accounts tell us) conspicuous by their absence. The approach from the plains of China to Si-ngan-fu and the road from thence for a part of the way towards Lan-chau-fu, is not unaccompanied by difficulties, as the yielding *löss* soil is there met with; but, immediately on entering the thickly populated districts of China, one may look for a most profitable return for one's capital.

With the exception of the Hoang-ho, there are no large rivers to cross, and the road is not thus endangered by periodical floods or the breaking up of ice. In winter the climate is, in truth, raw and cold, but, as far as we know, sufficient snow does not fall to occasion a block.

As far as the density of population is concerned, there is not much to choose between the country which this railway would traverse and South Siberia; there are, however, stations on the route which "tap" extensive tracts of country, and which are kept supplied with Chinese products, especially silk and brick-tea. From Lan-chau-fu there runs a caravan road to Sining-fu, which is a mart for Koko-Nor and Tibet, and another to Ning-hia-fu for the Ordos Land and the greater part of Mongolia. Turning away from these intermediate posts to Hami and Turfan, we may rest assured that they will become important centres

* This fact is corroborated by the Peking correspondent of the *St. Petersburgh Gazette*, see *Geographical Magazine* for April, 1874, p. 20.—Ed. *G. M.*

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of commerce, the first as an *entrepôt* for Yarkand and its dependencies, and the second for Uliassutai and Kobdo, while a line of trade stations would spring up along the northern slopes of the Tian-Shan. The trade of Si-ngan-fu with Central Asia might thus attain any dimensions.

But there is yet one feature which lends supreme importance to this route. The province of Shansi, which was carefully explored by the author of this article, can hardly be surpassed by any other province or country of the world in its wonderfully favoured coal deposits. These beds appear to run uninterruptedly through Shansi and Kansu. In the former province the seams are difficult to get at, but in Kansu they rival those of Shansi. Every province, indeed, north of the Kuen Lun range is well provided with coal, the seams being thick and the coal of excellent quality. From thence towards Hami, and from Barkul along the northern slopes of the Tian-Shan as far as Kuldja, coal is pretty abundant, and used as fuel at every station; while further south they are obliged to make use of grass and odds and ends of timber. As a rule in China, coal is never conveyed more than about 20 (German) miles from the pit's mouth, as carriage enhances the price so much; should, therefore, the information derived by the writer from native travellers be correct, coal beds must occur at most every 40 miles, and that through a country extending over about 30° of longitude, from the eastern borders of Shansi as far as I'lí.

The line is one not only favoured by nature, and one of which the importance is borne out by history, but its direction is exactly that best suited for the object sought, while the ease with which it can be laid down and maintained will render the cost of transporting goods very moderate.

The writer does not profess to give an opinion on the best route eastward after reaching Kuldja; in a geographical point of view there is here no knotty problem to solve, and the direction finally chosen will probably be determined on from political considerations in preference to any other motives. Leaving the valley of the Upper I'lí one soon reaches the level of lake Balkash, whither several railway-projects propose to run. Whether the railway from China will here be joined on to the proposed line from Tiumen past Omsk, Semipalatinsk, Vernoye to Turkistan and Tashkand, and thereby a communication effected with Europe, or whether efforts will be made to make a junction with M. de Lessep's proposed line to India, or whether again a line will be carried from thence right across the Kirghiz steppes to Russia in Europe, these questions have but a slight importance as regards that portion of the trans-continental line which will cross the plateau of Central Asia, inasmuch as at the most it can but effect its extreme western end. There can be little doubt that when the subject of land communication with China is taken seriously into consideration, it will be seen to be of the very first importance, while that with India is entirely of secondary interest, forming, indeed, as it does, but a part of the other.

To some sceptics the above scheme may savour of an excess of enthusiasm, but in the opinion of the writer its completion only awaits the development of interior affairs in China. Already have native merchants in the treaty ports learned to appreciate the importance of the telegraph, and the government has shown interest in the question of steamship communication, not only by the publication of an official paper, but also by encouraging the foundation of a Chinese Steamship Company. The Chinese are, in truth, a conservative people, but theirs is a conservatism which never retrogrades when it has once effected a reform. Railways may take years to make their way into the country, but when they are once introduced, *vestigia nulla retrorsum*, they will infallibly be caught up everywhere, for their appreciation of anything likely to pay is extremely lively. Thus strategical, political, and commercial considerations combine to make the construction of a railway from Si-ngan-fu to Suchow one of the most important events which could happen to China.

The importance of adopting the foregoing suggestions as to the question of railway communication between Europe and China is such as it would be difficult to estimate too highly. Europe, which is now beginning to feel the benefit of increased commerce with China, may well look with envy at Russia who will undoubtedly profit most by a railway across Asia. But when one particular country is favoured, as in the present case, by its geographical position, it is so much the more important to make sure of the probable consequences which will result from the inevitable development of events. The political and purely commercial results of such an undertaking, of course, lie beyond the scope of the present paper. But the effects of the bridging over of the vast expanse between the eastern and western civilisation, and the results of an influx of western ideas into the heart of China, a consummation against which she has striven so hard, is full of interest to all alike. The enormous amount of manual labour available, and the inexhaustible supplies of coal will cause the stream of European manufactures to flow back in its course. In all probability an important flow of Chinese emigrants will set westward, to partake of the advantages of a settled rule, and thus the extensive regions in Russia which at present are peopled by nomads may eventually be brought under the plough. Industry, practical sense, and temperance, constitute the Chinese as a people peculiarly fitted for agriculture.

Since the publication of the above remarks, the project has been discussed in Russian journals, and a signal proof of the importance attached to the general question of communication with China is shown by the fact that an expedition thither has already been organized, under the leadership of Captain Sossnofski, who is to be accompanied by a surveyor, a photographer, and three Cossacks. The party will journey from Kiachta to Peking; from thence to Si-ngan-fu and Hankow; and thence up the Han River, past Mienhien, and straight through Central Asia to I'lí.

BARON FERDINAND VON RICHTHOFEN.

A NEW VOLCANO EAST OF JAPAN. — Messrs. Alfred Rixon and Co., of Eastcheap, state that the captain of their steam-ship 'Harwich' has reported the discovery by him, on the 31st of December, while journeying from Japan to Hong Kong, of a large volcano, not marked on any of the charts, in latitude 31° 31′ N., and longitude 140° 14′ E. of Greenwich.

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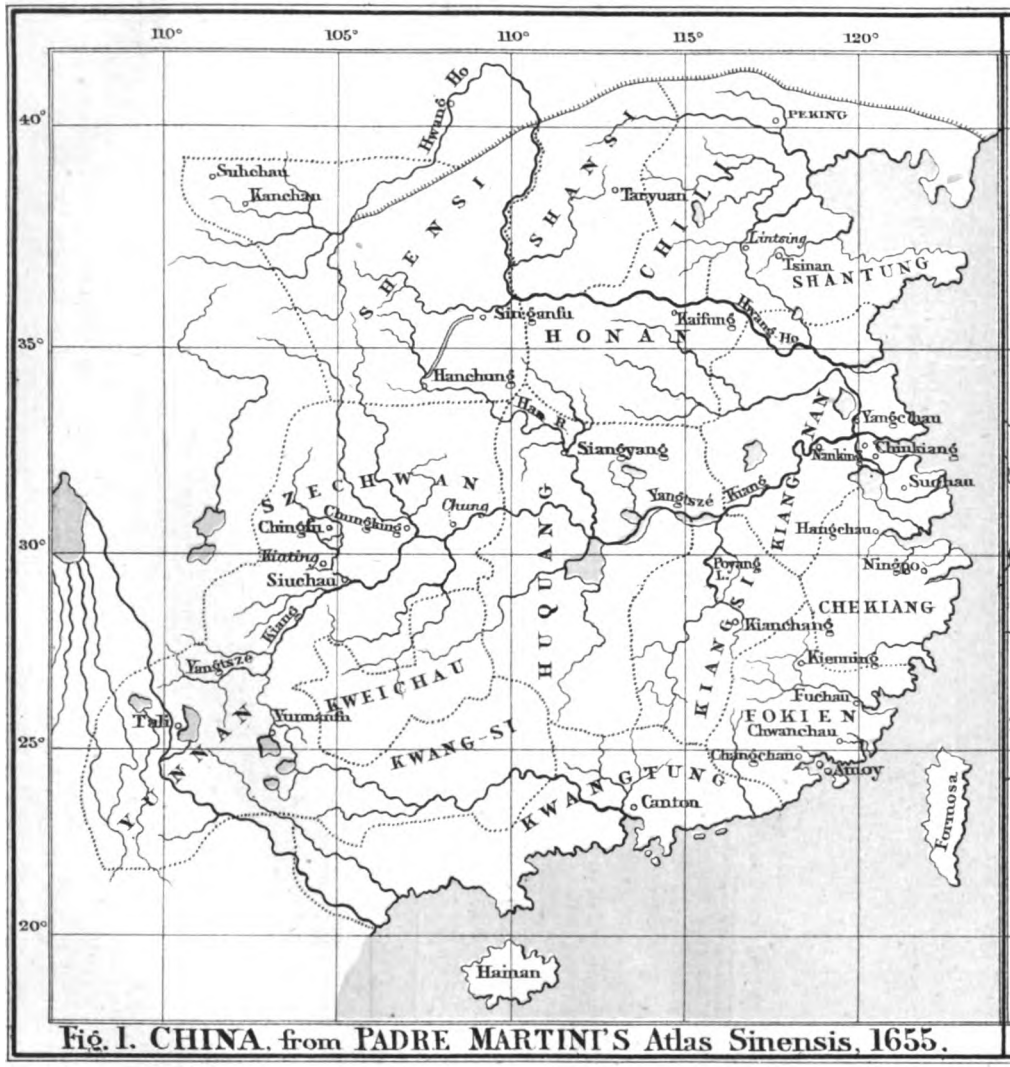

Fig. 1. CHINA, from PADRE MARTINI'S Atlas Sinensis, 1655.

Fig. 2. CHINA, from KEITH JOHNSTON's Royal Atlas, circa 1860.

T. Pettitt & Co., Litho, London

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THE ATLAS SINENSIS AND OTHER SINENSIANA.

AMONG the worthies of the past who deserve an enduring place among geographers, is surely the Jesuit Martin Martini, the author of the *Atlas Sinensis*.

That great work, as it well deserves to be styled, has been overlaid and displaced since D'Anville's publication of the systematic surveys executed by the Jesuits of the next generation, and probably few are now aware how good were the maps of China before D'Anville. To illustrate this, I have drawn out upon the same scale, on the same graticule, with common parallels, and with the assumption of the same meridian for Nanking, the skeleton of the general map from

Martini's Atlas, and that of Keith Johnston's Royal Atlas. I doubt if we should find the like collation of the map of any country in Europe executed in the middle of the 17th century, with a recent map of the same country, to afford a result equally creditable to the older map.*

Now this older map was based in large measure upon the indigenous maps of the Chinese themselves. Correction no doubt was applied from the observations of the earlier Jesuits, and probably the moderation of the limits of extreme error in the contour of the map is due to such observations, but we cannot tell to what the correction thus applied to the native materials amounted—something on the matter will be quoted below from the *China Illustrata* of Kircher; but there is very little information on the subject to be found in the *Atlas Sinensis* itself. One of the official sanctions to the publication, dated Brussels, 25th March, 1654 (meaning apparently 1655 of our calendar), calls the book, "a book written with the greatest conscientiousness and diligence, with extraordinary study and toil, compiled and put in shape from materials furnished by fifteen trustworthy geographical works, and now first published along with the maps of the same kingdom copied from the Chinese themselves" *(cum mappis geographicis ejusdem regni ex ipsis Sinensibus archetypis expressis)*. The most important allusion to the subject by Martin is in his Dedication to the Archduke Leopold, governor of the Low countries: "God having given me a call to China, during the time I have spent in that country I have traversed a large part of it, carried hither and thither, either in the blessed business of soul-hunting, or in flight from Tartar rage; I have examined the position of all the provinces and cities, and surveyed them accurately *(inspexi . . . accurate que dimensus sum)*, even till I came to a halt on that prodigiously long and stupendous wall . . . near the extremest limits of the East, and thence looked down upon the wide empire and many realms under Chinese sway, and subjected them to celestial measurement."

Again he refers to the error of the older maps (Mercator and the like) which placed the Wall in something like 50° of latitude, "when it is scarce two days' journey from Peking, and the latitude of that city does not exceed 40°, as I remember often to have

* There is a slight apparent fallacy here, for in this case the *recent* map is mainly dependent on D'Anville's, nearly 150 years old. But all actual recent surveys show D'Anville to be wonderfully correct in the main.

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observed along with my brethren; in fact, it sometimes came out 39° 59′."

An example of the native maps, such as were employed by Martini in forming his atlas, is to be seen in the Magliabecchian Library (now the Bibbioteca Nationale) at Florence. This bears a date corresponding to 1595, and was given to the Grand Duke Ferdinand I. by the traveller Francesco Carletti, who returned from his travels in 1601. This atlas contains maps of the then recognised fifteen provinces of China, and a variety of special maps of military frontiers, &c. It did originally contain a general map of China, but some rascal of a collector has torn it out. The provincial maps are all laid down on a graticule, but instead of being one of latitudes and longitudes, this consists of squares of 100 *li* to the side.*

The letterpress of the *Atlas Sinensis* is, like the maps, derived from Chinese topographical works, but is enlivened in many parts with notices from the personal knowledge of Martini; and he especially delights to expatiate in illustration of Marco Polo, of whose book he was the first intelligent elucidator; this he does with a genial enthusiasm which draws one to the man. Martini, a native of Trent, was at one time head of the mission at Hangchau, a city which then seems to have retained a large share of the glories of Kinsay, the name by which Polo has described it. In 1651, he was sent home on a deputation to Rome, but it was three years after his departure from China before he got there, for the ship was driven by storms north as far as Norway, and thence he travelled through Holland and Germany. After his business at Rome was done, he was despatched to Portugal, and embarked again for China with seventeen recruits for the mission. The same ill fortune befel the party; they fell not only among storms, but among pirates, who ill-treated them, and only after two years of mishaps the survivors reached Macao in an exhausted state. The *Biographie Universelle* says that Martini died at Hangchau, 6th June, 1661, his age being only forty-seven.†

Martini probably arranged for the publication of his atlas when in Holland on his somewhat circuitous route from China, *viâ* Norway, to Rome. It was published by Blaeuw, at Amsterdam, in 1656, and afterwards embodied in the tenth volume of that splendid work, Blaeuw's Atlas (1662).

Some indication is given by Kircher of work done by the Jesuits of the generation before Martini, which, no doubt, contributed very materially to the comparative accuracy of the maps of the *Atlas Sinensis*. Matteo Ricci—the first of the Order to gain a firm footing in China—was himself an accomplished mathematician; and, as early as 1611, the year after his death, two of his colleagues were employed on operations preliminary to the reformation of the Chinese calendar. Padre Giacopo Pantoja, one of these, devoted himself first to the establishment of the longitude of Peking by lunar eclipses, and then to the determination of the latitude of a series of the cities of China, from Canton north to Peking, by observations with the astrolabe. We cannot doubt that these observations were made use of by Martini in the correction of the Chinese materials.

Ricci was accused by the enemies of the Order in his own church of having set an example, followed by his successors, in too great laxity of accommodation to practices and opinions deeply rooted in the habits and feelings of the Chinese, but hardly compatible with Christianity; and we find a curious illustration of those tendencies of the man, which gave a basis for such accusations, in his dealing with geographical subjects. Among the scientific achievements of his time, which he took with him into China, there was a fine set of maps, which created at first great interest, but afterwards great disgust, when the Chinese came to appreciate the insignificant place awarded therein to the "Middle Kingdom"; thrust into a corner, instead of being set in the centre of the world, like the gem in a ring. Ricci, seeing their dissatisfaction, set about constructing a map of the world on a great scale, so adjusted that China, with its subject states, filled the central space of the hemisphere, and, without deviation from truth of projection, occupied a large space in proportion to the other kingdoms gathered round it. All the names were then very clearly entered in Chinese calligraphy. This map obtained immense favour, and was immediately engraved at the expense of the Viceroy of Canton, and widely circulated.

In the accompanying map (Fig. 3) we have endeavoured to realize this *Jesuitical map*, as we fear it must be called. Our map is a perspective projection of the hemisphere from a point at the distance of one diameter from the surface, and situated on the production of the radius which passes through the intersection of 115° E. longitude (Greenwich), with 30° N. latitude. Something pretty near this must have been Matteo Ricci's projection; with a vertex much more distant the desired effect would be impaired, and with one nearer neither of the poles would be seen whilst the exaggeration would be too gross for a professed representation of the globe.

H. YULE.

* Kircher says positively that the Chinese had no notion of latitudes and longitudes. Such knowledge must surely have been introduced by the Western Asiatic savants whom Kublai and his successors employed on the Astronomical Board, but it would seem to have passed away with them.

† Yet it is stated in the narrative of the Dutch Embassy of Van Campen, as given from Montanus, in *Astley's Voyages*, (iii. 437), that at a city of Fokien, which the narrative calls *Hokswa* (and which must be, as far as I can make out, *Hinghwa*, south of Fuchau), the party "met here with a slave deserted from Makau, who led them to a Christian temple, without the city, and told them that Martini, the Jesuit, who wrote the Chinese Atlas, died there thirty-seven days before." This was on 18th October, 1662, and would put Martini's death in Fokien, 11th September, 1662.

FUTURE OF THE FANTIS AND ASHANTIS.

IT is singular that whereas during the last twenty years the eastern and central parts of Africa have been traversed by many adventurous Englishmen, whose labours have enabled us to map out with tolerable accuracy vast tracts of country hitherto unknown and unexplored, next to nothing has been done upon the western coast. This is the more singular, since upon that coast there are numerous ports belonging to England, and a considerable extent of territory under her protectorate. At these ports expeditions could be organized under the most favourable circumstances, every assistance would be afforded by the resident merchants, and servants, carriers, and interpreters of known antecedents engaged. Yet in spite of the great

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advantages which such bases for expeditions afford to explorers, next to nothing has been done upon this western coast of Africa. Two or three gentlemen have indeed made little exploratory excursions, and reputations have been established upon the strength of trips which would provoke a smile from the great explorers of the East. The reasons for this pause in the progress of our geographical knowledge in that part of Africa which abuts upon our own possessions are manifold. The most cogent, however, is unquestionably the existence upon our northern frontier of the two powerful kingdoms of Ashanti and Dahomey. The monarchs of these countries have alike been averse to the presence of white men at their capitals, and hostile in the extreme to any passage through their territories to the tribes lying beyond them. Both capitals have been visited by white men, but they have travelled by certain roads and under certain conditions; and although, therefore, the direct roads from the sea have been pretty accurately described, the country beyond these narrow paths has been known to us only from native description. The great width of the belt of tropical forests, with its accompaniments of fever and dysentery, has likewise acted as a bar to travellers, while the depressing influence of the climate upon the coast has checked the enterprise of the English merchants resident at the ports.

It has been well said that the almost unbroken success of British arms is due in no small degree to the fact, that the British soldier never knows when he is beaten. It would certainly appear that the same ignorance of defeat is the only reason that can be assigned for the continuance of the British Protectorate upon the west coast of Africa. England is so accustomed to success as a colonizer that she shuts her eyes to the fact of her utter failure here. The establishment of European settlements upon the Gold Coast was almost coeval with the first settlements upon the shores of America. Africa offered brighter prospects of fortune than did America. The wealth of vegetation was unbounded, the soil was rich with gold, the natives were a peaceful race, differing widely from the fierce North American savage. And yet, in the one case we have colonized a continent, in the other, putting aside civil and military officials, the British population consists of some ten or twelve British merchants and clerks scattered from Cape Coast to the Volta. There can be no reason for supposing that the men who have during these 300 years gone out to Cape Coast have been one whit less energetic, less vigorous, less likely to open out a country, to make roads, to spread the civilization of the white man, than were the men who went out to America. The fact, then, that they have in all this time done next to nothing—that there are no roads made, no forests cleared, no ground brought under cultivation—is a proof that we cannot succeed in so pestilential a climate. It is probable that this vain effort, this struggle against nature would have ceased long ago, had it not been for the slave trade in the first place, and, after its abolition, for the missionaries. England having come to the resolution to abolish slavery, it was for a time most important that we should retain our hold of the West Coast, and thus entirely put a stop to the debarkation of slaves from that tract of country.

In spite of his long association with Europeans, the Fanti, outside the coast towns, is in a very primitive state. He uses European implements to a certain extent; but even in the matter of axes for felling trees, he still prefers a little hatchet made very much after the model of the axes of the stone period. With this he sits down at the foot of a tree and literally wittles it away until it falls. It is true that it takes him twenty times longer to accomplish his task than if he had used a broad felling-axe, but then the labour is but slight, and a negro hates above all things to exert himself. His utensils are of his own manufacture, and his clothes are of the most primitive kind. His huts show no sign of the influence of the white man, but are badly built, dirty, and uncomfortable. He is cleanly in his person, because he enjoys the coolness of water, but beyond this he has little idea of the meaning of the word cleanliness. He is, in fact, as much a savage as ever—indolent, crafty, false, and hating all change or innovation. His wife does all the hard work; and he has not even the exercise of the chase, which in other savage countries is, with fighting, the man's great duty as well as amusement. Outside the coast towns and a few missionary stations inland it is not clear that the influence of the white man has effected any change whatever in the condition of the negro. It might have been expected, however, that in the sea-coast towns, where Europeans have been resident for centuries, where European articles of all sorts are to be purchased, where European teaching is given to children, where there are European churches, and, above all, European employers and masters, a great change would have been effected. Except, however, among a very limited class this has not been the case. At Cape Coast, for example, there are, perhaps, some ten men among the native merchants who are as well informed as Englishmen in the same position of life. There are, perhaps, another twenty who have a very superficial education, who wear European clothes, carry canes in their hands on Sundays, and are upon a par with assistants at small shops here. There are some ten or fifteen of the wives and sisters of the upper classes who wear European clothes and can speak a little English. This is a fair *resumé* of the amount of improvement and civilization which English colonization has effected in three centuries. And, singularly enough, it would be found, could their ancestry be traced back far enough, that a great proportion of the classes I have mentioned have English blood in their veins. The surprising circumstance is that in no other way does the white blood show.

It is and always has been the almost universal practice for white men resident upon the coast either to go through some sort of marriage ceremony with a black woman, or to live with her without such a ceremony. What with merchants, clerks, officials, military men, and sailors, the number of white men on the coast has always been large. What has become of their offspring? The black population must be leavened with white blood—how is it that there are no signs of it either in colour or in feature? The answer is plain. Man may make changes, may hybridise, may so alter the appearance of things, animate and inanimate, that they will scarcely be recognized as allied to the original stock; but when man's care is withdrawn, and nature steps in, they revert to the old type. Turn the most gorgeous pansy out into a field, and leave it for a few years, and you will find the common wild heartsease

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growing in its place. So with the cross between the Anglo-Saxon and the negro woman. The children will for the most part follow the mother, and even the whitest of the children will, after marriage with negroes, be the parents of infants without a trace of their grandsire's white blood. It is not too much to say that there are not ten adults in Cape Coast whose features or colour indicate anything but pure negro blood.

Outside the circle of what are called the educated negroes, there is no sign that the natives have been improved or civilized by contact with the white man. There are, indeed, a considerable number of nominal Christians, because a good many children are sent to school, and at school they learn the Christian religion. Many of them continue in after life to attend Christian places of worship, because it is the respectable thing to do, and a negro loves to be respectable if it can be done without labour. No trace, however, of the white influence can be seen in their dress, their habitations, their customs, or their morality. Their dress is similar to that of the inland tribes; their houses are in no degree superior; their marriage ties are of the slightest; they are as lazy, as thriftless, as untruthful. What then have civilization and Christianity done for the negro that England should continue to pay so dearly to carry the experiment farther? It is true that Sir John Glover has spoken in terms of admiration of the conduct of a body of Christian negroes from the Basle Mission. The Basle Mission, however, proceeds upon the method of gathering its converts around it, and of making of them good workmen and prosperous men. It was natural that, trained by these missionaries, the negroes would be far more amenable, and would obey their officers more readily, than the bulk of the race. So far it may be readily admitted that much good is done by these working and trading missions. With the exception already named, it may be taken that the intercourse with the whites has failed altogether to impress a general tendency towards European civilization upon the negro. It is very curious to observe how, in Ashanti, an exactly opposite effect has been produced by the intercourse with the Moors upon the northern frontiers of that kingdom.

The Ashanti and Fanti tribes were originally one. Their language is almost identical, their features are similar, their traditions prove that the separation took place at no very distant period. The climate and circumstances of the countries are sufficiently similar for us to assume that these have had no great influence in modifying the intellectual capacity or physical condition of either race. Both lie in a country forest-covered and swampy. The very soil, with its decomposing granite base, and its deep alluvial surface is similar. Both people subsist principally upon yams, plantains, and other fruits. It might, therefore, have been taken for granted that each of the branches of this kindred people would have been equally accessible to outward influences, and that as the Fanti has proved impervious to the civilizing influence of his white neighbour, so the Ashanti would have proved impervious to the Moorish tribes upon his frontier. When, however, the British troops crossed the Adansi Hills, they found that they were in a country where everything showed signs of Moorish influence. The architecture, the curious reliefs which ornamented the walls of every hut of the smallest pretension; the articles of furniture; everything, in fact, bore signs of Moorish influence. And yet the actual contact with the Moors can have been but slight; certainly no greater, probably much less, than that of the Fantis with the English. There was a sort of Moorish colony at Kúmasi, but there is reason to believe that it was in Kúmasi only. Even in point of trade it is probable that the trade of Ashanti with its Moorish neighbours was less than with the whites at Elmina and Cape Coast. And yet Ashanti bore everywhere traces of Moorish influence. In art it was infinitely more advanced than any negro kingdom or country hitherto visited by white men, but its art was all Moorish. This immense advance in civilization by the Ashantis while the Fantis were standing still, can only be explained upon the theory that the Moor has more affinity for the negro than has the Anglo-Saxon. In other climes, among other peoples, the Anglo-Saxon is the best agent of civilization that the world has ever seen, but with the negro he fails. I have shown that, when crossed, his blood dies out in a generation or two, and in this respect he has less affinity for the negro than have the people of Southern Europe. The half-caste Spaniard, Portuguese, or Italian is notoriously a far superior type to the offspring of the Anglo-Saxon and the negress. Even the French is superior to the English mulatto.

It is evident by parity of reasoning and by what we see in Ashanti, that the Moor would assimilate far more readily with the negro than does the Spaniard or Portuguese. The negro does not feel that the copper coloured Moor is a being so far removed from himself as is the pallid Englishman he sees upon the coast. The step between negro savagery and Moorish semi-civilization is not so great. The white man deals in prodigies: he has his fire ships and his breech-loading guns, he has his tight-fitting clothes, and his high hat. Hence, while the negro will copy the semi-civilization of the Moor, he only wonders at the civilization of the Englishman.

From our utter and complete failure to civilize the Fanti, from the inability indeed of nineteen out of every twenty Englishmen even to exist upon the coast, I am convinced that we must, sooner or later, abandon our costly and useless protectorate. The trade which we carry on there is of very slight importance. The quantity of oil produced is small, and there is no other article of export save gold. The oil trade, and indeed other trades, can, as is proved in the trading stations at the Bight of Benin, be carried on equally well without the presence of a single soldier or the possession of a single foot of ground. That Africa may some day become civilized, or at any rate partly civilized, I believe, but the instance of Ashanti proves to us that the civilizing agent must be the Moor, not the Anglo-Saxon. Already he is extending his dominion southwards with rapid strides, and, as we see, his influence is reaching where his arms have not yet arrived. Wherever the Moor carries his arms there he plants his religion. The diffusion of Muhammadanism over Ashanti and Fanti land would be an unmixed blessing. We, with our scruples, force no one into the Christian fold. The Muhammadan has no such hesitation. Before his sword the fetish rights, the abomination of heathen sacrifices would vanish. If Africa is ever to be civilized it must be by the Moors. We have failed utterly, and must from the nature of things

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continue to fail utterly at present. Some day we may succeed. It will be far in the distance for, as a preliminary step, Africa must first go through the civilizing effects of the ascendancy of Moorish ideas, of Moorish custom and art, and of the Muhammadan religion. When he has made that progress, it is possible, although I think hardly probable, that the negro may be fitted for making another step forward, and for receiving European civilization and the Christian religion. The advance which we have been striving to get him to make is too great. The change from nakedness to a frock coat, from fetish worship to Christianity, from a canoe to a steamboat, is too much for him. English people are greatly deceived at home by missionary statements of the number of children attending schools and the number of communicants at church, into the belief that the people are fast becoming christianized and educated. How far this is from the truth may be judged by the documents signed on the 14th of November last, by all the chiefs and captains, that is to say, by all the leading Fantis at Cape Coast, giving over to Sir Garnet Wolseley the right of impressing the male population. Of the twenty-four signatures appended, one was written by the English judge, one by Mr. Thompson, the interpreter, all the rest, without exception, made their mark X, and these were the leading Fantis of Cape Coast! It is possible that we shall still continue to struggle for the impossible, that we shall waste millions more money and hundreds more lives, but we shall, I am convinced, have at last to come to the conclusion that the Anglo-Saxon cannot extend his civilization among negroes under the tropics. Then, and not till then, will there be hopes for the Fanti. The heavy blow which we have struck at the power of Ashanti will in itself bring the Fanti nearer to his emancipation from fetishism and barbarism. The power of Ashanti stood like a wall against the southward movements of the Moors. They have already prepared their way in Ashanti by the introduction of their arts, it is probable that they will ere long follow with their arms, and strike a death blow to the hideous cruelties of fetish worship. Ashanti once Muhammadan, Fanti-land will not long remain in barbarism and heathendom.

G. A. HENTY.

EMIGRATION.

THERE is no subject on which misapprehension and fallacies are more easily propagated, and with more fatal success, than in reference to the state and resources of the several countries and colonies which are willing to receive emigrants. In proof of this assertion it is only necessary to call attention to the case of those deluded agricultural labourers, who were induced, in 1872, to emigrate from Warwickshire to Brazil, in the hope of improving their condition. The prospects held out to them were most encouraging and most tempting to labourers who could not maintain themselves and their families on 12*s.* a week. They were assured that in addition to a grant of a plot of land, a paternal government would, on their arrival, be most solicitous for their individual comfort. They would live on "beef, veal, lamb, fowls, ducks," and an unlimited supply of vegetables. Beef was said to cost from 2½*d.* to 4½*d.* per lb., the climate was most salubrious, and the soil literally teeming with wealth.

Immediately after their arrival in this "land of promise" private letters proved that they had been grossly misled, that they could not procure even the common necessaries of life, and that their condition was far worse than in their native villages. Small-pox committed ravages amongst them, and in a few months' time all who could escape from the country returned to England to find themselves worse off than when they left it.

Our object in referring to this disastrous undertaking is not to discourage emigration, but rather to point out how necessary it is for all who desire to emigrate to act with care and deliberation, and to apply to the most authentic sources for information, which is easily accessible. Before referring, however, to the magnificent field open in our colonies to all those who cannot find employment at home, it will not be uninteresting to refer to the causes which have resulted in past years in regular and exceptional rates of emigration.

Emigration is governed by the ordinary laws of supply and demand. In England, a country of circumscribed area, the regular annual emigration is consequently traceable to the great increase of population, and to the want of a corresponding increase in the means of obtaining a living. Exceptional emigration, such as that which existed during 1847 and the six following years, and again in 1863 and 1872, is simply the result of persons searching for cheapness or employment according to the tide of human necessities. To such causes we are indebted to the introduction into this country, during the reign of King Edward III., of weavers and manufacturers of woollen cloths from Flanders, as also to the immigration to this country of upwards of 50,000 French after the revocation of the edict of Nantes. But these are matters of history, and passing them by with a simple notice, it will be more to our present purpose to review the causes of those exceptional rates which have occurred within the memory of the present generation.

We find that between the years 1847 and 1854 inclusive no less than 2,444,800 emigrants left the shores of Great Britain, or at the rate of nearly 100 persons a day. The chief cause of that immense exodus was the awful famine in Ireland; and the departure of so many souls was a most fortunate circumstance of that disaster, for it improved the condition of those left behind; it arrested crime and agrarian outrage, and it relieved the country at large of a starving population which found means of subsistence in a new land. In the three following years 1855-57, there was a decrease in the annual number of emigrants which amounted to 566,236. The cause of this decrease is easily accounted for by the Russian War, and the consequent demand for recruits both in the army and navy. In 1857 and 1858 the numbers were again very low, viz., 234,414, and this is satisfactorily explained by the mutinies in India having again created a demand for recruits, and also by the commercial crisis in America, and the consequent cessation of a demand for labour in that country. In the four years between 1859 and 1862 inclusive, 500,000 emigrants left England, many of whom were attracted to Australia by the large gold discoveries in the colony of Victoria. 1863 was again a remarkable year in the annals of emigration, for no less than 223,758 persons left this country, a number not far

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short of the annual average number which left during the Irish famine. Driven from England by the widespread distress in our manufacturing districts, thousands were attracted to America by the high wages ruling there, and by the bounties offered to recruits required by the struggle for supremacy between the Northern and Southern States. No less than 146,000 persons emigrated from England to America in that year.

During the eight years between 1864 and 1871 inclusive, there has been a steady emigration from this country, averaging some 220,000 souls a-year, chiefly to America; and in consequence of the high price of provisions, and the strikes which have occurred amongst the labouring, artisan, and mining population of England, private individuals and public societies have emulated each other in collecting information and devising schemes for assisting those in distress to leave this country for more congenial shores. In these circumstances it needed no prophet to foretell that in the year 1872, a number far in excess of recent averages would emigrate to other lands, and I am now in a position to state that it exceeded the average emigration of the last seventeen years by no less than 109,971. 295,213 emigrants left the United Kingdom in that year, of whom, however, 79,023 were foreigners. It may be here noticed that the emigration of foreigners through this country is annually increasing, and that before 1864 it was inconsiderable.

It will be to the point to enquire now how the different English colonies promote emigration. Much has been said in regard to the necessity for Government interference, and many persons think that the Home Government has power to allot lands in the colonies for emigration purposes. But this is quite a mistake, for when representative institutions were granted to the colonies of the Australasian group the control of all lands was handed over to the Local Legislatures; and when Canada and its provinces were united into one great Dominion, the Lands, Woods, and Forests of the provinces were handed over to the control of the Government of the Dominion. The only means, therefore, by which emigration to our distant possessions can be promoted, is by the action of the Colonial Legislatures; and I will now proceed to review the inducements which they hold out, merely observing in passing that, looking to the proximity of the United States and to the liberal terms on which an emigrant can obtain land in America, it is clearly impossible that the bulk of emigration can be attracted to our rich and fertile colonies unless equally liberal terms are offered by them, or their greater advantages are more truly known.

The assistance given by Canada consists in an allowance at the rate of $10 per statute adult towards the passage of such emigrants who may be approved by the agent of the Dominion in this country.

Free emigration to New South Wales and Western Australia is for the present suspended. It may here be remarked that Western Australia comprises an area of 626,111,323 acres, out of which only 51,724 are cultivated.

Free passages are not granted to South Australia, but approved persons, paying the whole cost of their passages, are granted land warrants, exchangeable on arrival in the colony for land orders of the value of 20*l.* for every adult over twelve years of age, and 10*l.* for every child under that age. In this colony there are still 270,000 square miles open for settlement; and a trans-continental railway 2000 miles in length, which will open up millions of acres of land, is in course of construction. It is stated that there is not a single able-bodied pauper in the colony, and that the Government proposes to spend some 35,000*l.* in the introduction of fresh population. Emigration to Victoria at the cost of public funds is suspended.

As regards Queensland, free passages are granted to female domestic servants, and to approved emigrants of the farming class; but those granted free passages are not entitled to grants of land in the same manner as those who receive assistance and land orders on the principle adopted in South Australia.

Assisted passages are now granted by New Zealand to navvies, general farm labourers, ploughmen, gardeners, and others; and free passages are offered to single female domestic servants and dairymaids, between the ages of fifteen and thirty-five.

In all the Australian colonies it may be said, without entering into details, that wages range from 5*s.* 6*d.* a day for a common labourer, to 9*s.* 6*d.* or 10*s.* for a skilled mechanic; that a leg of mutton, which costs here 7*s.* or 8*s.*, may be bought there for 3*s.*, and that with the exception of house-rent which is from 6*s.* to 8*s.* a week for the labouring classes, money will bring far more than in England. As a proof of the welfare of the general community, it need only be stated that the consumption of what we consider luxuries is comparatively five times as great in Australia as in England.

The magnificent dominion of Canada and the prospects which it holds out to the emigrant deserve a separate paragraph.

The immigrant arrivals in that country have of late years been quite insufficient to satisfy one-third of the labour demands, as the immense agricultural and other resources of the dominion are practically unlimited. There is no fear of causing a glut in the Canadian labour market. Food is plentiful and cheap —bread being little over a penny a pound; meat, 4*d.* to 6*d.*; potatoes, 1*s.* to 2*s.* a bushel; milk, 2½*d.* a quart; and other articles in proportion. The inducements, however, to emigrate to Canada, as well as to Australia, are not simply good wages and good living in a rich country with a fine climate, but the confident prospect which the poorest may have of becoming a possessor of the soil, earning competence for himself, and comfortably settling his children. The fullest information in regard to Canada and Australia can be obtained on application to the several agents who represent those colonies in this country.

My object in writing this paper is to warn British subjects from risking their health and independence for inadequate remuneration in a country like Brazil, which possesses a trying climate, and is inhabited by people of different habits and ideas to their own, and to point out to them the magnificent opening afforded by our colonies. Though the distance from home is further, and the passage expenses to Australia may be greater, there are works to be undertaken and land to be settled which can absorb for years to come the surplus population of the mother country. It is impossible to conceive the amount of wealth and popula-

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tion that will ultimately be gathered in these vast and fertile regions. At a moment when our population is hurrying in great numbers to America, where, by the way, the land available for settlement must be well nigh exhausted, publicity should be given to such facts as I have stated, in order that would-be emigrants might reflect on the superior attractions of our noble colonies, where there is peace, abundance, freedom in civil and religious matters, and a greater amount of comfort amongst the labouring classes than ever can be attained in this country.

WILLIAM ROBINSON, F.R.G.S.

IMPRESSIONS OF JAMAICA.

CHAPTER I.—GETTING THERE.

LAND—though it be no better than a guano heap, such as is the Island of Sombrero, leased by the British Government to a fertilizing company—is lovely to look upon after a long voyage, especially when we are not going ashore there, but know it is merely a sign-board, so to speak, hung out in front of a hostelry. We had left London on New Year's Day, 1866; and on the second evening of that January, memorable at home for its extreme rigour and for the terrible losses at sea caused by the gales that blew round our coast, the 'Atrato' put out from Southampton Water. Such a hurricane as we encountered outside the Needles had not visited the shores of England for nine years. It was not till the third day of our departure that, still beating off Cornwall, we managed with the greatest difficulty to send our pilot ashore. All who were on board that ship, on her voyage of official enquiry into the true character, motive, and circumstances of the negro rising in 1865, have good cause to know that we were nearly given up for lost—that one gale in which the iron-freighted 'London' foundered was then believed to have sent us likewise to the bottom; that an unconsidered spar, thrown overboard from our vessel, with the name 'Atrato' branded upon it, was picked up on the Welsh coast, and was regarded despairingly as a token of our fate; that the insurance of the cargo was multiplied six or eight-fold by the underwriters in one morning; and that the letters which some of us received from home, by the mail that followed us out to Jamaica, seemed to have been written in an agony of doubt whether they would ever meet our living eyes. There was no telegraph, so recently as the time I speak of, between the West Indies and England; and the 'Atrato' herself carried back from St. Thomas to Southampton the tidings of her safety.

The rapid passage out of one climate into another is an experience which no familiarity with steam travelling can ever make contemptible by depriving it of its triumphant or despondent magic, as the case may be. To-day, you are shivering in the gelid fog of an English January; the next, as you gaze through dazzling sunshine at some orange-covered island of the Azores, whence a little fleet of rowing-boats has put out to meet you, with tempting cargoes of fresh-plucked fruit, you find that an awning spread over the ship's quarter-deck scarcely suffices to veil the intense light of the sky; and, lo and behold, all the officers have sported white trousers. The novelty would have seemed to us the more curious and remarkable if we could then have known that on this very 10th day of January every town in England was blocked up with snow, and the drifts on the moors and wolds were deep enough to bury horse and man. From the day marked by white duck, when the glass stood at 76° in the shade, wherever there *was* shade for it to stand in, the temperature rose and rose day by day, almost hour by hour; but a delicious breeze never failed, and when, from having been against us so far, it suddenly came round to our side—when, in fact, we were fairly within the influence of the trade-winds—it was not hard to imagine ourselves in the tropics already. An interest in the distance the 'Atrato' made each day seemed to quicken with the growing heat. I wonder whether that rack or driftwood, "ragged and brown," which is so plentiful in the broad and ever-flowing Gulf-Stream, cheered the hearts of the old discoverers as they voyaged in this track, and looked and longed for land. Day after day we saw it—*we*, who knew our distance from any coast, and yet could *not* see it without thinking of the shore it had fringed or clothed. Two successive Sundays on board the 'Atrato' brought together in the saloon nearly all the passengers and as many of the officers, crew, and engineers as could be spared from working the ship, to offer up their common prayers and supplications to the Eternal Power that alone spreadeth out the heavens, and ruleth the raging of the sea; that hath compassed the waters with bounds until day and night come to an end. Surely there is something very impressive in the adaptation of our forms of prayer to the different conditions of existence on land and on sea. The service of the Church was read by Captain Jellicoe, as there did not happen to be an ordained clergyman on board. Sunset and sunrise, bright starlight, and the glory of noontide, how often these were watched by silent groups on the deck of the 'Atrato' it is needless to say. But it will be long indeed ere I forget the time so quietly varied.

At last came one White Monday, when, after the sky had been brighter, the sun more powerful, and the cool breeze astern sweeter and more refreshing than ever—when we had hung for hours listlessly gazing in the shade of the white canvas canopy at shoals, or one should rather say flocks, of flying fish, like wet swallows, coloured with prismatic light on their gracefully curved backs, and whiter than the swan's neck below their dragon-fly wings—when summoned by the bugler's lusty performance of "The Roast Beef of Old England" to the dinner table, we found that festive board more festively arrayed than usual—when, in short, the last day on board the 'Atrato' being at hand, the last dinner-party was signalised by the toast of the captain's health, the proposer being Baron Magnus, Prussian Ambassador to Mexico. The "first awful night and following stormy days" of our run to St. Thomas were duly noted in his Excellency's eloquent retrospect, by way of praise to Captain Jellicoe's seamanship, as well as of contrast to the gaiety that had followed. The Baron's speech, hearty and polished, struck the right note, and was followed by cheers for the brave sailor, who acknowledged the kindness in a few frank, well-chosen words; and next day, sure enough, the 'Atrato' was in the harbour of St. Thomas.

Being on our way to Jamaica it is not unprofitable

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to notice here that this island, one of the three belonging to Denmark, is a free port; that the cultivation of the soil has in a great measure given way to trade; that the harbour is always full of merchant-ships; that land is rapidly rising in value, wherever a warehouse can be beneficially built; and that, as an instance of the increasing prosperity of the place, some short time before that spring of 1866, a resident who had bought a bit of ground for $3000 sold a mere slip of it, on the edge of the harbour, for nearly twice that sum.

The harbour in question is landlocked, and was notoriously unhealthy, till a canal was cut which brought a current through the once stagnant shark-pond, and as a matter of course improved the sanitary condition of the port and town of Charlotte Amelia. This is the coaling-station of the Royal Steam Packet Company; and it was here that the 'Atrato' debarked her passengers, some of whom were going to Santa Cruz, some to Colon by the steamer 'Solent,' some to Havaña by the 'Eider,' and some to Jamaica by the 'Conway.' The greater number of this division, to which I belonged, went ashore for an hour or two, and made purchases of bananas, cheap and good cigars, plantain-leaf fans, linen shoes, Panama hats, and pale yellow suits of some superlative gossamer-like material, arrayed in which we looked like perambulating lemon ices. On returning on board the 'Atrato,' we found her now disordered deck crowded with negro women, who offered for sale articles inferior to those we had purchased ashore, and at double the prices. The passengers for Jamaica by the 'Conway' numbered only seventeen, and these, with two young Haytiens whom we were to put ashore at Jacmel, took leave of St. Thomas and the 'Atrato,' at daybreak next morning. Our little steamer was manned principally if not wholly by a black crew, with a black boatswain of considerable intelligence and great good humour. The officers, of course, were all English, including properly under that term some who were Scotch; for the Royal Mail Steam Packet Company was at first a Scottish enterprise; and the national character and associations cling to it still. On the second morning of our run from St. Thomas, quitting my berth as usual before daybreak, I found that we were approaching the island of Hayti, the red dawn casting a glow over the sea in our wake and over the strange land before us. We had on the previous day coasted the magnificent panorama of the Spanish island of Puerto Rico. An indescribably pure carmine was the colour of the sun as it rose above the many-tinted waters of the Caribbean Sea. Above the orb hung golden clouds, embossed on a golden sky of paler tint; and the island was flushed with the warmth, which spread a lurid canopy over the fantastic tops of the peaked hills, and branded the fierce faces of the rocks with seams and scars of fire. When these appearances had subsided, and the red glow of sunrise had given place to the white heat of a tropical day, a very bright and truthful sketch in water-colours was made from the deck of the 'Conway' by Mrs. Russell Gurney, the only lady of our party on board the Jamaica steamer. Nor were the productions of her skilful hand the sole memorials of that passage among the islands of the west which she was able to preserve. Nature as well as Art contributed to her stock of interesting remembrances; and on the last day a flying-fish, taking a too ambitious flight, fell exhausted on the ship's deck, so that, being captured, it was presented to the lady by one of the officers. Next morning, we were in Kingston Harbour.

Whatever may have been said to the disparagement of Kingston, it is a decent place enough, if only for the facilities of getting out of it, and for the first impressions of coming in. I for one shall speak of it with toleration, if not with love. I liked the look of the town when I saw it on that gloriously bright and amazingly hot 20th day of January from the deck of the little steamer. We had all been prepared for something pleasant by the beauty of the coast scenery, culminating in the magnificence of the harbour, and of the gorgeous colours of the sea, just at its entrance. So near is a vessel obliged to pass on rounding the point of land on which is built Port Royal, that it is customary to fling the tribute of one penny ashore. I shied my bronze with so jubilant a force that the coin was lost to sight, and, as I feared, might have become to memory dear by having broken a window of Admiralty House. An officer whom I am so happy as to call my friend, Sir Leopold M'Clintock, was then commodore at the station, and his flag was flying over the roof of the building I have mentioned. I did not break his glass, nor did he find my penny. As soon as possible, after reaching Kingston, I went to pay him a visit, and when we had taken up some old threads of well-remembered cruisings in the Baltic and the North Sea, in the 'Aurora,' last of our wooden frigates—she was here in Kingston Harbour, strangely enough—the great navigator told me more in half an hour about the physical geography and historical association of the spot on which I found him, than I could learn in a week from any number of printed books. But let me not neglect my present purpose, which is to tell the reader something of my impressions of Jamaica, and of Kingston first and foremost. We were long enough steaming up the seven miles of water from Port Royal to observe the most trifling objects among all that was so new and strange to most of us. The dark, clustering foliage of the mangrove-bushes, covering the coral islets, and dipping their branches into the water, for oysters and limpets to fasten on and grow; the tall graceful cocoa-nut trees, rustling their plumes in the gentle stir of the soft sea-breeze; the change from blue and amethyst to a pale clear emerald tint in the tranquil shallows near shore; the various birds that few of us could tell the names of, and most conspicuous among them the man-of-war bird, an immense black variety of the sea-gull, often measuring ten or eleven feet from tip to tip of his pinions, and with a body which, though of great size, seems small in proportion to the marvellous reach of his flight. All these things and many more forced themselves on our notice, impatient as one might have been to land. And now, on the point of accomplishing this long desired act, I leave for awhile the account of experiences on "the Land of Streams."

GODFREY TURNER.

(To be continued.)

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Reviews.

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JOURNAL OF THE ROYAL GEOGRAPHICAL SOCIETY.—1873.

THE first paper in the *Journal* for 1873 contains an interesting account of the Garo Hills, by Major Godwin Austen, with a geological appendix. The next paper, on a projected railway route over the Andes, from the Argentine Republic to Chile, is by Mr. R. Crawford. In compliance with a request of his employers that he would, while engaged upon surveys for a proposed railway from Buenos Ayres to Chile, collect all such information as would be of interest to the Geographical Society, Mr. Crawford forwarded the results of his observations, with a carefully prepared map. He has added some important geographical knowledge to previously existing maps; especially with regard to the Rio Grande, a tributary of the Colorado. Mr. C. W. Lawrence, of the Legation in Japan, contributes an account of a journey in the interior of that interesting country from Kiôto to Yedo, by the Nakasendo road. The journey of Sir Frederic Goldsmid, from Bandar Abbas in the Persian Gulf, through Sistan, to Mash-had, the capital of Khurasan, in 1872, is described in a very interesting paper; while Sir Henry Rawlinson furnishes a valuable essay on the ancient history and comparative geography of this part of the east. The narrative of a journey through Western Mongolia, from China to Siberia, by Mr. Ney Elias, is the record of a remarkable geographical achievement, which obtained for its author the Gold Medal of the Royal Geographical Society. The journal contains two papers bearing on Arctic research. The most important is Mr. Major's conclusive proof of the authenticity of the voyages of the Zeni in the 14th century, with a determination of the site of the lost colony of Greenland. The other is a review of recent discoveries east of Spitzbergen, and of attempts to penetrate the Polar pack on the Spitzbergen meridian by Mr. Clements Markham. Mr. Thomson contributes notes of a journey in Southern Formosa, and Captain Stevens has a report on the country around Aden, including an excursion into the territory of the Howshabi tribe. Mr. Howorth's paper on the recent elevations of the earth's surface in the northern circumpolar region is a careful and laborious attempt to record, with some degree of accuracy, the existing state of our knowledge with reference to the upheaval and subsidence of Arctic lands; and is a most welcome contribution to our knowledge of physical geography. Major Wilson, of the Topographical Depôt of the War Office, furnishes a comprehensive account of the recent surveys in Sinai and Palestine, and especially of the trigonometrical survey of Palestine commenced in 1871. The volume opens with Sir Henry Rawlinson's anniversary address, delivered on May 26th, 1873; and containing, with the usual general review of the progress of geography, an admirable statement of the achievements of recent Arctic explorers, and a report on Sir Henry's own efforts to further the good cause.

THE MADEIRA AND AMAZON.*

THE accomplished German engineers, Joseph and Franz Keller, were charged by the Brazilian Government, in 1867, to explore the rapids of the river Madeira, which obstruct the navigation between Brazil and Bolivia, and to report upon the best means of improving this important line of fluvial communication. They reached Manaos, at the mouth of the Rio Negro, by steamer, but many official difficulties retarded their further progress. At last, in May, 1868, the Kellers continued their voyage in a canoe, in company with a Bolivian merchant, and with provisions for four months. On the 9th of June they reached Borba, 25 leagues above the mouth of the Madeira; and thence continued the voyage, with seventy Moxos Indians from the Bolivian Missions on the Mamoré. Higher up, at Crato, there is a cattle farm, on meadows the extent of which are unknown, but which probably extend to the river Beni. This is now a flourishing establishment, the cattle having been brought from Bolivia in launches or large canoes along the rapids of the Madeira, by Senhor Antonio de Barros Cardozo, a Brazilian citizen, who has thus conferred a great boon on the valley of the Amazons, where fresh meat is so scarce. Here the river is 1000 yards in width, and the climate is described, by the Kellers, as excellent. Between Crato and the mouth of the Madeira there are many India-rubber gatherers, and hunters of turtles. In September thousands of these turtles congregate on the island of Mutuns and on the beach called Tamanduá, and deposit their eggs. India-rubber gatherers and fishermen meet every year to collect the eggs for making butter, and as there are 2000 jars of butter made on the shore, each jar taking about 2000 eggs, there must be an annual destruction of 4,000,000 turtles' eggs.

The Kellers arrived at the first rapid of San Antonio on the 16th of July. At this point it is necessary to unload the canoes, and transport everything 500 yards over the rocks on the left bank. It took them five weeks to pass the other sixteen rapids; reaching the uppermost, at Guajará, on the 24th of August. Above the falls the character of the river changes entirely. The inclination becomes perfectly regular, and very slight. On the 1st of September, the travellers arrived at the junction of the Itenez and Mamoré, which are here 325 and 650 yards wide respectively; the waters of the Itenez being bright green, and of the Mamoré a yellow tint. In the rapids the vegetation is rich and luxurious, but above them it becomes stunted, a zone of low shrubs merging into prairies. Here, on the banks of the Mamoré, is the estate of the distinguished Brazilian Antonio de Barros Cardozo, who has lived in Bolivia for fifteen years, and was one of the first, in modern times, to ascend the Madeira in large craft. A few leagues above his estate is the town of Exaltacion, the first Bolivian settlement on the Mamoré. Thence Franz Keller proceeded to Trinidad, the capital of the Department of

* 1. *Vom Amazonas und Madeira.* Skizzen und beschreibangen aus dem tagebache einer explorationsreise von Franz Keller-Leuzinger (Stuttgart, 1874).

2. *Report of José and Francisco Keller*, made to the Imperial Government of Brazil, and published in the *Government Relatorio* of 1870. Translated from the Portuguese by George Earl Church (London, 1873).

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Beni, where he was furnished with five canoes and rowers to continue his investigations.

The Department of Beni is the portion of Bolivia, in the valley of the Amazon, to the eastward of the Andes, which is watered by the rivers Beni and Mamoré. The total indigenous population is estimated at about 30,000 souls, distributed in fifteen missions or towns. The four most important are Trinidad, Loreto, San Ignacio, and San Xavier, all inhabited by Moxos Indians. The eleven other missions are formed by the Canicharas, Itonawas, Baures, Cayubabas, Mobimas, and Maropas Indians. But these are all branches of the Moxos, according to Hervas, and the older missionaries. In going up the river, the Kellers took a series of astronomical and hypsometrical observations. In descending they made a detailed plan of the river, and some measurements of the cubic volume of the rivers Mamoré, Beni, and Madeira. They returned to Pará in December, and reached Rio de Janeiro on January the 4th, 1869, after an absence of fourteen months.

The results of their expedition are extremely valuable, and are given in six sections—on the climate and geology, on astronomical observations, on hypsometrical measurements, on projects for improving the route, on statistical data, and on comparative calculations of freights by the different routes.

For the last ten years there has existed a small traffic on the Madeira, by canoes, between the Brazilian town of Serpa on the Amazon, and the missions on the Mamoré, the influence of which extends from Santa Cruz de la Sierra to Pará. In 1868 from fifty to sixty canoes came down the Madeira from Bolivia, with an average freight of 8750 pounds, so that the total weight of goods transported was 700 tons. The rapids extend over 70 leagues between San Antonio and Guajará, for the passage of which there are three plans. One is an inclined plane, the second is the opening of a canal on the right bank, and the third is the construction of a railway about 50 leagues in length. Of these the Kellers consider that the railway would be the most economical. On the lower Madeira the chief article of export is the India-rubber or caoutchouc, the present annual export of which, from the whole Amazon Valley, is about 5000 tons, more than half coming from the Madeira. The trees flourish best on the *igapó*, or recent alluvium, which is inundated during the time of flood in the rivers. It is supposed that the annual inundation is necessary for the production of the milk. The Bolivians have shown extraordinary enterprise in conveying cargoes of their quinine-yielding Calisaya bark from the Andes, down the Madeira and Amazon, and across the Atlantic to Liverpool. The freight of a load of 250 pounds of bark to the Pacific is $50, while the freight down the Amazon to Pará is only $10. At present a new line of steamers runs up and down the Madeira as far as the first rapid at San Antonio.

The Kellers recommend that cotton should be planted, on a large scale, in the Bolivian Department of Beni, and that machinery should be introduced to clean and weave it: that new cattle estates should be formed on the immense prairies; and that the roads from the Andes should be improved. It appears that, within the last three years, 2000 Bolivians have descended the rapids of the Madeira to find employment on the banks of the lower river; and it seems clear that Colonel Church's view is the right one, and that a railway round the rapids would have an immediate and permanent effect in opening a great trade between Bolivia and the Atlantic.

The report of the brothers Keller is full of valuable information, and Colonel Church has added to the debt of gratitude which geographers already owe to this indefatigable explorer, by presenting it to English readers in a convenient form. The German volume of Franz Keller, published at Stuttgart, is magnificently got up, and is illustrated by a number of beautiful engravings, which are the author's own work. South America, and especially the Amazon Valley, has been fortunate in her explorers; but few have exceeded the Kellers in the value of their observations in their own special branch of knowledge, and in the conscientious carefulness of their survey.

SOUTH BY WEST.*

THE substance of this book is probably already known to many of our readers, as a series of papers in *Good Words*, by Miss Kingsley. It appears in its new form anonymously. We cannot help thinking that it was misplaced modesty to withdraw the name, for now that we are so overrun with books of travel, when every one who leaves his home for a few months, or even weeks, thinks it necessary to publish his impressions—utterly foolish and erroneous though they may often be—it requires some strong inducement to overcome the distaste that one feels for this kind of literature. None could be stronger than the name of Kingsley, whether it be associated in our minds with the primeval forests and tropical scenes of *Westward Ho!* and *At Last*, or with the less striking, but scarcely less lovely, bits of fir-wood and heath, or moorland scenery in the *Prose Idylls?* Such true love and appreciation of nature, with the power of describing it, may be expected to be more or less hereditary, unless indeed, we are to believe nothing of the "hereditary genius" theory, of which we hear so much at present. But perhaps the authoress was wise in wishing to stand on her own merits, without owing anything to the lustre of her father's name, and she has certainly proved her capacity for doing so in the amusing pages before us.

One characteristic of this work is the natural, straightforward way in which it is written. There is never the slightest attempt at "tall talk." We owe her one debt of gratitude for sparing us the passage across the Atlantic, with the eternal description of porpoises and flying fish which invariably accompany the traveller.

In a page and a half we find the steamer anchored inside New York harbour, where "we were soon summoned below to the saloon, to be inspected by the doctor; and, crowding in, sat positively suffocating for some time, no doctor appearing; till at last a voice at the door announced, 'You have been inspected, and the doctor has passed you all,' and out we trooped again. But how it was managed—whether the doctor

* *South by West; or, Winter in the Rocky Mountains, and Spring in Mexico.* Edited (with a Preface) by the Rev. Charles Kingsley, F.L.S., F.G.S., &c. London (W. Isbister & Co.), 1874.

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marked us down as we went in, or took a telescopic view of us through the windows—no one ever found out."

She takes us also rapidly through the well-known scenes of New York, Niagara, and West Point. At Niagara she was most impressed with the "extreme beauty. There was nothing horrible—hardly awful. The water as it fell looked so soft. I tried to think of what it reminded me most in substance, and all I could think of was whipped cream!—a sad bathos, but true."

At West Point the thing "that sent a thrill through one to one's very finger-ends, was a small conical shot, not 12 inches long. It was 'the shot' that opened the war, the one fired on April the 12th, 1861, on Fort Sumter. Opposite it was the return shot from the North, a round ball."

But Miss Kingsley's real adventures began when she left her English friends at Baltimore, on her way West to spend the winter with her brother in Colorado. Most graphic is her description of this winter at the Colorado Springs. The first weeks were spent in a "wooden shanty, 16 feet by 12, ordered on Thursday and finished on Saturday." By the side was her brother's tent, which served as the general sitting-room by day, and as his bed-room at night. Rather queer quarters for an English young lady to find herself in, especially as occasionally her brother had to leave her to go up to Denver on business; but the worst evil that she met with was a severe "scare," from prairie wolves one night.

However, they soon moved into a more solid house, where their quarters were luxurious compared with those they had left, it being a very minor evil to find, on getting up in the morning, a little snow-drift on the floor, nearly 2 inches thick, which had drifted in through the cracks in the door, and key-hole! Whatever the weather was all through that winter—and the cold was often intense—they had to go for their meals to the restaurant half-a-mile off, their means of cooking being limited at home, where "an invaluable tin dipper served for saucepan, glass, jug, and every use imaginable." Miss Kingsley thus describes her life:—

"I get up at 7 A.M., in the cold frosty air. M. comes in and lights the stove; heats some water; and by 8 we are ready for a walk to the restaurant, with a fine appetite for breakfast . . . . . Then, if there is time, we take a stroll, and look for reeds and stones. There are all sorts of stones and crystals to be found here . . . . . At 9 work begins, and I attend to my household duties—sweeping the rooms, &c., and then am ready to help M. in his work. At 12.30 the train comes in, and we go down to dinner. At 5.30 it is almost dark; supper is at 6, and then we shut up our tent and spend a cosy evening."

This was their life in the tent: later on we hear of evening dissipations in the shape of house-warmings, "surprise parties," &c. Our authoress occasionally diversified her proceedings by spending a morning at the wash-tub; for finding that washing was done very badly at 10s. the dozen, she wisely determined to attempt it herself. She says, that "after scorching a few collars, getting into a state of black despair with the starch, rubbing the skin off my knuckles with the rubber, and burning my hands with the irons, I have turned into quite a good laundress."

But though this was the usual life, Miss Kingsley and her brother found time for many and various excursions, going long expeditions in the roughest of carriages with the most unmanageable of mules. The grandeur and beauty of the surrounding country must be very striking. Miss Kingsley thus describes her first view of a cañon, one of those most curious natural formations with which the readers of Dr. Bell's *New Tracks of North America* are so familiar.

"The trail led up the bed of a little stream, then dry, which had sawn its way through walls of sandstone of every imaginable colour, from rich purple and crimson to salmon colour and white. The rocks were worn into the most fantastic shapes, battlements, castles and pillars, hundreds of feet high, sometimes almost closing in the path; then opening out on one side or the other into almost perpendicular hill-sides, covered with piñon, red and white cedar, Rocky Mountain pine, and *Pinus Douglassii*. . . . Then came a sudden twist; the rocks almost met over our heads, sandstone on one side, limestone on the other; and I touched both sides of the cañon at once, without stretching my arms to full length. It was the wildest scene—the towering rocks, black pines, and white snow. We looked such impertinent atomies, daring to venture into the heart of the mountains. I never heard such stillness before; it was quite oppressive; not a breath of wind, not a leaf stirring; no sound or sign of life, save ourselves and a solitary hawk wheeling round against the streak of blue sky we could see from our prison walls. For about a mile we went up, twisting and turning every twenty yards, so that, looking back, one could not imagine how one had got in, or would ever get out again."

At Christmas our authoress and her brother went down to Denver and comparative civilization for a week's "good time." There the skating rink was the great attraction; and many a performer at Prince's this season must echo the melancholy statement that "the fact of being a first-rate skater on ice does not help a bit on roller skates."

The inauguration of a reading-room, getting up a grand concert for the benefit of the funds of the said room, and attempting to keep school, helped to take up the remainder of the winter. And great must have been the loss to the colonists of the Colorado Springs when, in March, Miss Kingsley started with her friends, General and Mrs. P., for San Francisco, whence they intended to go down the Pacific to Manzanillo, and then to drive or get the best way they could across Mexico to Mexico City. "M" meanwhile and the engineering party were to go overland, no easy work or pleasant prospect. They were warned that "ha'ar is riz down south," which in western phraseology signified that as they had to pass through the Apache Indian country, they ran a chance of getting scalped. The rendezvous was to be Mexico City.

Till our party landed in Mexico, they had had plenty of discomfort and of roughing, but no real danger; but Mexico was in a state of revolution, and there was now the fear of their falling into the hands of the rebels, or if they escaped them, they ran the far greater risk of falling a prey to one of the many bands of robbers which infested the country. All they could do towards ensuring their safety was to keep a sharp look out, take all possible precautions, and press on as fast as possible. The ladies had been instructed on board the steamer in the mysteries of pistol practice, at any rate sufficiently to avoid shooting their companions. In one of her early letters our authoress speaks of trying to cure her uncontrollable dislike of firearms by keeping one of the rifles on her knee till it was wanted; she seems to have succeeded pretty well, as in Mexico we find her buckling on her full-sized Smith and Wesson revolver, and already beginning to look on it as her best friend. She tells us

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that "a regular plan was arranged in case of an attack from robbers. We were all to fire at once, without giving them time to come near. 'Fire low and keep cool' were the orders. Then we ladies, if the ruffians did not run at once, were to throw ourselves on the floor of the carriage, and fire from under cover, while the gentlemen got out to fight." However, unfortunately for all these grand preparations, although the precaution was taken of hiding the arms, at one place where our party was changing horses, two or three "Pronunciados," or rebels, appeared on the scene, and requested permission to search the coach for arms, and as "expostulation was in vain and resistance out of the question, that party being but the outpost of another body," our travellers had the extreme mortification of seeing their five beloved rifles delivered over to the enemy: they had fortunately been able to hide their pistols under their clothes. They afterwards discovered that their party had been watched and followed from the coast, for that the leader of the revolution, Don Porfirio Diaz, had, unknown to them, been their fellow passenger on board the steamer. However, they succeeded in getting an escort to take them over the worst robber districts, and got safely across to Guadalajara, where they rested for a few days before resuming their tedious journey in springless carriages or ambulances, or broken down stage-coaches, across roads the very description of which is sufficient to make one's bones ache. In one place, Miss Kingsley says, "never have I felt the equal of that shaking: it was not mere stones or screes, but downright rocks, between which the wheels would stick, and the mules stop short; and then came a perfect hurricane of bad words, blows and stones, till we went up with a jerk that sent us flying." The nights were generally spent in bad inns, with worse beds. However, the greatest mishap that befell them was General P.'s nearly shooting two unfortunate gentlemen, whom in the darkness he had mistaken for robbers, and who had good naturedly ridden up to ask the party to spend the night at their house.

At last, one afternoon, two months after they had left the coast, they approached the far-famed city of Mexico :—

"The air was fragrant, like England in June, from damp grass and the roses which lined the ditches everywhere. Popocatapetl was in an ill-humour, and hid his head in clouds, so that we only saw the grand slope up towards the snow-peak: but even that was enough to give one an awful feeling of unknown size and height; for the great blue ghost carried one's eye up and up till it seemed to mingle with the very clouds themselves."

Our travellers were soon indulging in frantic congratulations at the sight of a railroad, which to them appeared the harbinger of law, order, and civilization.

Miss Kingsley certainly possesses a keen eye, and we should also add a cool head, for through all that journey, exciting as it must have been, she is making observations on the scenery of the country through which she is passing, and on the manners and customs of the inhabitants. If they rest for a few days she enters into the toils and pleasures of sight-seeing with as much zest as if that were her sole object. A statistical tone indeed pervades her writing, but we must remember that one of the objects of the journey was to get some idea of the possible traffic for a railroad. Whether it might not have been better to collect the statistics by themselves, and to publish them separately, perhaps in these very pages, which have already contained a paper on Mexico by the so-often-mentioned "M." of this book, remains an open question. At any rate the authoress herself thoroughly enjoys a snub which on one occasion their statistical thirst received—

"There was a large olive-yard and a mill where a good deal of olive oil is made—how much exactly we could not ascertain; for after General R. and Señor A. had both tried to find out how much an olive tree yielded, and had both failed signally, Mr. Y. 'went for,' the man, who completely shut him up by replying 'Oh, as much as God pleases.' We tried no more statistical questions after that."

Miss Kingsley's adventures were nearly over after their arrival at Mexico, where they were soon safely joined by the surveying party. Though even in these civilized parts it was not safe to take a ride out of the town without going fully armed, the robbers being so numerous.

Our authoress seems to have been deeply impressed with the extreme beauty of Mexico, and with the interest of its historical associations, and to have enjoyed the six weeks she spent there to the uttermost. Any one who, after reading her descriptions, takes an interest in Mexican life and habits, ought to visit the case of Mexican curiosities at the Christie collection in Victoria-street.

The journey from Mexico to Vera Cruz was performed without any adventure, and there our authoress and her friends embarked, and were heartily glad to find themselves once more safe on American soil, after nine months of such varied experiences as we should think have rarely fallen to the lot of an English young lady.

We have made no mention of two or three of the most amusing chapters in the book, and of several western stories which are supplied by the pen of "M.," but to quote passages from them would only spoil them; they must be read in the original to be properly appreciated.

The book is supplied with a map, excellent as far as it goes, but it is only intended to show the route pursued by our party; and with several very good illustrations, of which all we can say is that we wish there were a few more.

We close *South by West* with a feeling of regret, and with an earnest desire that if ever it should be our fate to travel in those parts, it might be with just such a companion as our authoress has proved herself in these pages.

CAMPAIGNING ON THE OXUS.*

ON laying down this book after perusal the reader will certainly arrive at the conclusion that the *New York Herald* is most fortunate in its selection of correspondents. Before the Khivan campaign commenced, the Russian Government issued an order forbidding any newspaper correspondents to accompany the forces. There was an old order also in existence (which was dug up for the author's special benefit), forbidding any Europeans to penetrate into Russian Turkistan. But neither these edicts, nor the horrors of the deserts, nor the fear

* Campaigning on the Oxus and the fall of Khiva. By J. A. MacGahan, correspondent of the *New York Herald*. (Sampson Low.) 1874.

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of being picked off by roving Turkmen, was sufficient to deter Mr. MacGahan from his resolution to catch up General Kaufmann and the Tashkend column on their road to Khiva. And the way he carried out his design fairly earns our admiration as it did that of the Russian officers. The interest of his narrative is enhanced too by its modest style, and the welcome absence of "bookmaking." It is truly a description for the most part of what he himself saw and heard.

The author had intended to start from Kazala on the Lower Jaxartes, and follow the southward track of the Grand Duke Nicholas and his column across the desert. But here the first serious obstacle presented itself in the shape of a polite Russian captain, who could not take the responsibility of allowing the author to proceed on so dangerous a journey. This only resulted in his starting instead from Perovsky, which is considerably further up the Jaxartes, and where no opposition was offered to his movements. The Kirghiz or nomad tribes, among whom he was on the point of venturing, have the reputation of being robbers and murderers and hostile to Russians. But Mr. MacGahan with a discretion which we suppose is justified by its success, determined to throw himself entirely on their hospitality and generosity. It is true he was not wholly unprovided with means of defence.

"Being a man of peace, I went but lightly armed. A heavy double-barrelled English hunting rifle, a double-barrelled shot gun, both of which pieces were breech loading, an eighteen-shooter Winchester rifle, three heavy revolvers, and one ordinary muzzle-loading shot gun, throwing slugs, besides a few knives and sabres, formed a light and unpretentious equipment."

But these weapons were handed over to the host on entering his tent, and this proof of confidence seems to have gone straight to the Kirghiz heart. An additional means of insinuating himself into their good graces, *i.e.*, through the ladies of the establishment, was not neglected. Mr. MacGahan, we understand, is young, and this book certainly affords abundant proof that he is extremely susceptible of the influence of female charms. On one occasion indeed, when in the town of Khiva, this tender weakness, combined probably with a certain love of adventure, led him to explore, on a moonlight night, the harem buildings, where, after wandering through numerous courts, up staircases, through corridors, and dark, dismal rooms (in one of which he nearly dropped down a well 50 feet deep, and in another, almost set fire to a large heap of gunpowder stowed in a corner), he finally found himself in the midst of a circle of laughing damsels, with whom he took tea and sweetmeats with perfect equanimity. But we are anticipating.

The tract between the Jaxartes and the Irkibai Wells traversed by the author, though thinly covered with vegetation, is not sheer desert. Thin grass, brushwood, wild tulips, and other flowers grow in tolerable profusion, a fact which may probably be accounted for by the vicinity of the Jaxartes, and of the Yani-Daria, probably the old bed of the former. The Kirghiz nomads, alluded to above, are the inhabitants of this region, and their habits and mode of life, are graphically described by the author. "They possess," he considers, "in a remarkable degree the qualities of honesty, virtue, and hospitality—virtues which our civilization seems to have a remarkable power of extinguishing among primitive people." Their wandering habits—habits which lead each *aul* or family to pursue one particular itinerary, which is exactly the same as that of their ancestors, and which never interferes with the movements of other *auls*, though the paths, shown on a map, would meet, cross, and intersect each other in the most apparently entangling fashion—these habits, we repeat, are accounted for by the Kirghiz themselves in a most simple manner. On being asked by the author why each *aul* did not stay in its winter quarters, and not attempt to wander about purposelessly in the summer months, an intelligent Kirghiz replied "Well our fathers never did so, and why should we not do as they have always done?" And this is probably about as near the true reason of their migrations as any other.

On leaving the vicinity of the Yani Daria, our author plunged for the first time into the Kizil-Kum Desert, and its attendant horrors. The face of the country indeed is fair, and its undulations are covered with a rich, dark verdure.

"But all this beauty is deceptive. These gentle hills are only sand, and the verdure which clothes them hides horrors as great as those covered by the roses that twine themselves over sepulchres. Blossoms shoot up, ripen, die, and rot in the course of a few days. The verdure consists of but a rank, soft weed that breaks out into an eruptive kind of flower, which, dropping off at the slightest touch, emits a most offensive odour. Beneath the broad leaves lurk scorpions, tarantulas, immense lizards, often 5 or 6 feet (!) long, turtles and serpents, and the putrifying bodies of dead camels. Once lost in this desert ocean, without guide or water, you may wander for days, until you and your horse sink exhausted to die of thirst, with the noxious weed for bed, winding-sheet, and grave."

Mr. MacGahan resolutely pushed on through this terrible wilderness, in face of considerable physical obstacles, the mutinying of his followers, the death of one of his horses; and after obligingly delivering the mail bag, which he had himself brought, to Colonel Weimarn, the officer in charge of the station of Khala Ata (40° 52′ 52″ N. latitude, and 33° 10′ E. of Pulkova), he not only received no thanks, but was even forbidden to push forward and attempt to join General Kaufmann without his Excellency's written order. The author was in a dilemma. He could not see Kaufmann without his permission, and could not obtain his permission without seeing him, because (*teste* Weimarn) he was too busy to answer letters. With characteristic resolution the author cut the Gordian knot by escaping from the camp in the darkness, and not long after succeeded in coming up with Kaufmann's column at Sheik Arik, on the banks of the Oxus. From this point all seems to have gone as merrily as possible, and Mr. MacGahan became a general favourite with both officers and men. Of the latter he remarks:—

"The Russian soldier is very far indeed from being a savage. He is neither cruel nor bloodthirsty, as far as I have seen, but, on the contrary, rather kind and gentle when not enraged; and I saw many soldiers do little acts of kindness to the Turkman children, during the campaign against the Yomuds, which greatly struck me. The lower classes of the Russian people, although ignorant and superstitious to the last degree, are not by nature either cruel or brutal."

Their childish pleasures sometimes take a shape somewhat unpleasant to the object of their affections. At a banquet given by the Grand Duke Nicholas to his regiment, the author was astonished to see the royal host (after dinner) tossed up and down in the air by his own soldiers. The same extraordinary

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compliment was then paid to Mr. MacGahan himself, and it was not until afterwards that he learnt that this is a special mark of affection, reserved for favourite officers.

As our readers are probably aware, there was little hard fighting in the Khivan campaign. The Khivans might have offered serious resistance by fighting from behind walls and buildings, and by destroying bridges after them, but even this latter simple expedient never seems to have occurred to them. The Yomud Turkmen, however, kept up a sort of guerilla warfare, which harassed the Russian troops in some measure, inasmuch as their wonderfully swift horses enabled the Yomuds to evade pursuit. On one occasion, indeed, these fiery horsemen took the Russians completely by surprise, and had it not been for the breech-loaders of the Russian infantry, who came up in time to save them, the Cossacks would undoubtedly have been routed and massacred to a man.

The most remarkable part of the Khivan expedition, and that which will entitle it to rank as one of the most wonderful campaigns ever known, is the manner in which four of the five columns engaged, successfully accomplished their perilous marches across the desert, and converging towards the same point from bases of operation more than 1000 miles apart, actually arrived at Khiva within a day of each other! Their movements are lucidly described by the author, the march of Colonel Verefkin claiming particular attention.

Mr. MacGahan, although not a surveyor, furnishes one or two interesting geographical facts. From Colonel Verefkin he ascertained that the Gulf of Aibugir, which is so conspicuous on all our maps, is now perfectly dry, and that Kara-Kalpacks have commenced to cultivate its ancient bed. A little to the south of Yuzkuduk, which lies to the south-east of the Bukan-Tau Mountains, he came upon a range of mountains which appear not to be marked on any map, but which would seem to be a continuation of the Urta-Tau Mountains, marked on the latest Russian map. These and other features are shown on a carefully executed map of Khiva, and the surrounding deserts, drawn by Mr. MacGahan to accompany the present work.

We cannot conclude without expressing our pleasure at the unaffected style in which the work is written. Indeed, the author goes so far as to disclaim any credit for his exploits.

"The position of a correspondent is often a very embarrassing one. He embarks, perhaps, on an enterprise without fully counting the cost, or foreseeing, or appreciating half the difficulties to be encountered in its accomplishment, and then feels obliged to put on a brave face, and carry it out at whatever risk, when in his inmost self he knows that if he were a free agent, he would be among the very last to undertake it. In this way he often gets a reputation for foolhardiness, or pluck, or perseverance, or 'cheek,' which he really does not merit."

We have little doubt, however, that the reader will award the author more credit than this for his undoubtedly hazardous enterprise, and for the pleasant way in which it is told.

EXPERIMENTAL MILITARY SURVEY OF THE RUSSIAN CONFINES IN ASIA.*

IV.

THE seventh section of the Russian Asiatic frontier—following the line from east to west—passes from Kuitun Mountain (N. latitude 48° 50′) which forms the knot of the Great Altai, the Ektak-Altai, and the Salugem ranges, to Khan-Tengri (latitude 42° 21′), in the Tian-Shan Mountains. In other words, it commences at the sources of the Bukhtarma, an affluent of the Irtysh, follows the ridge of the Great Altai, called at this extremity the Narym Mountains, as far as the sources of the Kurchum (another affluent of the Irtysh), and passing from thence along the Kurchum Mountains and to the eastern shore of Nor-Zaisan, it ascends the Black Irtysh to Ak-tuibe. From the latter point it runs due south across an open waste to Chagan-Obo (4683 feet above the sea level), a point at the knot formed by the Mus-tagh and Tarbagatai Mountains. It then proceeds in a north-westerly direction along the Tarbagatai Mountains to Urdjar (latitude 47° 5′, E. longitude 99° 15′ from Ferro),† where the Russo-Chinese frontier at present terminates. In fact the Russo-Chinese delimitation under the second treaty of Chuguchak (1864), extended from the Kuitun only to Khabar-Asu‡ in the Tarbagatai Mountains; to the south and west of that point there never was a definition of the boundaries of the Russian and Chinese possessions. From Urdjar the frontier may be said to lie along the post road leading from that place in a southerly direction over a desert and steppe country between the lakes Sassyk and Ala-kul to Lepsinsk§ (latitude 45° 31′, and E. longitude 98° 27′ from Ferro). From Lepsinsk the Russian cordon runs westwards along the northern base of the Dzungarian Alataù Mountains to Kopal, falling in before reaching the latter town, with the high road from Ayaguz (now Sergiopol) to Almaty, or Vernoë. From Altyn-Emel, between Kopal and Vornoë, the Russian military line is pushed up the road leading over the Altyn-Emel Pass (3500 to 4000 feet) across the western spur of the Dzungarian Alataù up the valley of the I'lí to Borokhudzir and Kuldja. The length of this road from Altyn-Emel to Kuldja is 254 miles. In advance of Kuldja the Russians have a picket post at Mazar, and so hold possession of the entire valley of the I'lí River, including those of the Kash, Kunges, and of all its other tributaries lying between the Iren-Khabirgan Mountains, which shut out the Kur-Kara-Usu district on the east, the Khatun Daba range, which extends to Urumtsi, and the Tian-Shan on the south. Ascending the I'lí River as far as the easternmost extremity of the Alataù Mountains (called by Semenof the Trans-I'lí range), the Russian border passes up the valley

* Opyt Voënnago Obozrenia Rouskikh Granitz vo Azii.

† Ferro West Ex. 18° 9′ 42″ W. of Greenwich.

‡ Sary-Cheku, the crater of Khabar Mountain, is situated in latitude 47° 13′, and longitude 100° 38′ W. of Ferro.

§ Actually, however, the Russians have advanced beyond that line, occupying Bakty within 10 miles of Chuguchak, and Kaptagai, between the Dzungarian Alataù and the Barluk Mountains, between which two points, relatively north and south, a route intersects the valley of the Emil, cutting off Ala-kul from the Chinese district of Chuguchak and throwing it over to Russia. Colonel Veniukof adopts this line as one of actual limitation in the present, by faintly colouring it green on his map.

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of the Tekes, the main source of the I'lí, which is thus wholly absorbed. Here the Russians command the northern ascents of the passes over the Tian-Shan, leading to Aksu, Bai, Sairam and Kucha in Eastern Turkistan, as well as the route leading from the sources of the Koksu into the valley of the Yuldus and Khai-dugol or Khara-Shahr River. At the sources of the Tekes, the Dzungarian section of the frontier falls in with the line of the Tian-Shan, which will be separately treated on a future occasion. The distance, as the crow flies, from the sources of the Tekes to Kuitun Mountain does not exceed 567 miles; the frontier line, however, had, in 1872, an extension of 1133 miles, which, under the treaty of Chuguchak (1864)—if the latter had come into operation—would, Colonel Veniukof says, have been curtailed to 985 miles. The peculiarity in this section of the Russian Asiatic frontier is, that it runs zigzag from one end to the other, either across rivers, wide open spaces, and mountain ranges, or following river courses, and falling in for some distance with the direction of the mountain ranges which in the shape of a see-saw figure like this ≷—laid from W.N.W. to S.S.E. closes the great gap between the mountain systems of the Altai and the Tian-Shan.

This configuration of the country gives a series of open valleys, wedging into each other from opposite sides. The absorption by the Russians of the whole of the Black-Irtysh, with the occupation of the basin of the Ulungur Lake, at the head of that valley, would leave the Chuguchak district deeply let in between two sides of the Russian line, and standing at the extreme north end of the sole Chinese line of communication passing from Barkul and Urumtsi through Kur-Kara-Usu. Kur-Kara-Usu has an entirely independent water-system lying between Chuguchak and Kuldja districts, in a valley formed by the Alatau, Barluk, and Orkhochuk Mountains, which stretch in one continuous line on the north, and the Iren-Khabirgan, extending on the west from the Alatau to the Katun-daba, which latter as a continuation of the Trans-I'lí-Alatau—running from the northern side of Issyk-kul—merges with the parallel range of the Tian-Shan, a little to the south-east of Urumtsi, from whence these mountains in single chain, after describing a curve to the north, proceed in a south-easterly direction, separating the former Chinese Nan-lu (or southern line) from the Peh-lu (or northern line), and after passing between Barkul and Khami, finally lose themselves in the Great Desert.

Such is the nature of this country that least of all the other sections of the frontier can the Dzungarian line be termed either definite or permanent. And since the limits of the Chinese and Russian dominions in this quarter have never been defined by any official deed, the Russian Cossacks have accordingly advanced step by step; creeping up the rivers, followed by the Siberian peasant, whom his Government has cautiously transplanted thither, endowing him with the lands thus silently appropriated, without any remonstrance on the part of the drowsy Celestials.

The Russians have been side by side with the Chinese in I'lí and in Dzungaria since the middle of the last century, but the first treaty engagement, referring to this section of the frontier, between their respective governments, was that of Chuguchak, in 1851, which, however, related merely to matters of trade. By virtue of this treaty the Russians established a factory in Chuguchak, where they traded with the Chinese until the year 1855, when at last the factory was burned down by the people, who thus put an end to a traffic with the Russians which, in the course of three years, represented a capital of 8000*l.* This was never resented, nor were the amicable relations between the two empires ever disturbed either by the gradual encroachments of the Russians from the north, or imperilled even by the "inruptions" of the Kalmucks into the Russian borders. There is no doubt, however, as Colonel Veniukof observes, that if the Russians had any inclination to act aggressively on the Dzungarian line, they could make as large strides there as in Turan. The transmigrations of the nomads from one empire to the other, would always afford sufficient cause for recriminations and quarrel, and produce a pressure from the Russian side upon the Chinese, leading to conquest and annexation. In the year 1863 there occurred indeed a serious collision of Russians and Chinese troops near Borokhudzir,* but this led to no grave consequences, and, acting up to the spirit of their policies, the two Governments adjusted the matter satisfactorily. On the other hand if the Russians long abstained from conquests in Dzungaria, it was because their hands were stayed by reasons which did not prevail elsewhere. In the first place the neighbouring territory belonged to a mighty empire, and could not be overtly infringed upon without a serious breach between two great powers bound by international obligations, yet I have read an article by Professor Vassilief, in which that writer advocates an unceremonious violation of all obligations, with respect to the preservation of boundary limits, entered into with China, on the grounds of the studious exclusion by the Chinese of Russians, from countries closed to them (traders included) by mutual agreement.

A slice of Chinese territory here and there could not be put into the scale of these relations. There never has been any call for a break with China, and the Russian military forces were never sufficiently numerous or even on a footing to be marshalled in regular warfare against the banners which the Chinese could array against them. The Russians, however, advanced their outposts one by one without opposition towards the Chinese frontier, occupying the intermediate territories of the Kara or Dikokamenni Kirghizes (called Buruts by the Chinese) and of the Chinese Kalmucks. In doing so they thrust back the nomads upon the mountains in the south, and extended the Siberian line in one direction to the Bukhtarma and thence to Nor-Zaisan, and in another to Ayaguz-Kopal, and Almaty.

* The provocation came from the Russians, who marched two detachments from Kopal to Borokhudzir, then a Chinese post. Refusing to retire beyond the Yugontas Pass over the Alatau, they were attacked by the Chinese. The officers successively commanding the expedition were Captain Golubef, Major Ertofski, Lieut.-Colonel Lerche, and Captain Obukh. It was asserted by the Russians that by the treaty of Peking, the Russian frontier was to touch a point near Borokhudzir, and Colonel Golubef intended to execute a survey up to that point. It would appear, however, that as the rebellion which broke out in Dzungaria in 1864 was then smouldering, the Russians who, from the information which they received, foresaw the probability of the downfall of the Chinese, sought to anticipate it by preparing to seize a point of great vantage in the centre of the I'lí Valley.

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Under these circumstances the course pursued was encouraging settlers and colonizing the Cossacks, whose fishing propensities invariably led them higher and higher up the rivers at seasons when the Kalmucks decamped to the south, and when the Chinese outposts were withdrawn to the permanent settlements into the heart of Chinese territories. Thus it was that the Russians gradually felt their way into the valley of the I'lí until, with what the French would call a *savoir faire*, it was finally absorbed by them, that the valley of the Tekes was entered, and that Nor-Zaisan and Ala-kul, with a portion of the Black Irtysh, and almost half the valley of the Emil were lopped off from China, while from the *Zaisanki* post on the north-east, and from Bakty in the immediate vicinity of Chuguchak, the Russians seem to be closing round the latter with all the memory of their forfeited rights.

We will here allow ourselves a brief retrospective glance from the period of the first Russian hold on the Irtysh. That river was first secured to the Russians by the famous Cossack, Yermak, who finally lost his life in it. Quoting Semenof's geographical dictionary, the Irtysh served later as the principal highway along which the Russian population first penetrated into Northern Asia. In 1653,* according to the same authority, the Irtysh was ascended to Nor-Zaisan by the Russian Embassy to China, under the Boyar Theodore Baikof, which passed the Seba,† a left affluent of the Irtysh near Ust-Kamenogorsk. The Turgut Khan, who afterwards died at the mouth of the Volga, was building the famous palaces on that river, known as Ablai's Halls, which now with the adjacent Buddhist monastery present a pile of imposing ruins. In the end of the 16th century, the Russian towns of Tuimen, Tobolsk and Tara sprang up on the Irtysh. In 1715 Peter the Great sent an expedition to the Irtysh under Colonel Bergholtz, with instructions to proceed thence to Yarkand. According to Abramof, Captain Urasof and Ensign Somof ascended the Irtysh to Nor-Zaisan under similar orders in 1719; and in the following year, as is stated by Abramof (the date given by Semenof is 1715), General Likharef proceeded from Tobolsk in thirty-four flat-bottomed boats, with 440 soldiers, thirty field-guns, and six mortars, to Nor-Zaisan, and up the Black Irtysh as far as that river was found to be navigable. In Peter's time a series of forts was erected in this region. The wars of the Kalmucks in the middle of the 18th century, the energetic operations of the Chinese in Dzungaria in 1757, and the agitations consequent on the terrible atrocities committed by the Chinese, awakened the Russians to the necessity of consolidating their own line of frontier. Accordingly, they established the line of the Ishim simultaneously with the foundation of Petropavlofsk, in order to connect that of Eastern Siberia with the Ural frontier. That line subsequently underwent exactly the same process as the lines of the Ural, of Orenburg, and of Eastern Siberia. Losing its significance as a military cordon, through the spread of Russian influence, far in advance of it during the second half of the eighteenth and the beginning of the nineteenth century, it lapsed into a simple line of communication between Russia proper and her Siberian provinces. As the Imperial frontier, it faded away with each stride taken on an average every ten years since the beginning of this century. Ayaguz, now called Sergiopol, was founded in 1831, Kokbekty in 1836, Kopal in 1841. The year 1855 marked a period of considerable advance. To the east of Kopal, in the direction of Chuguchak, the Russians pushed their advanced posts to Lepsinsk, and to the south-west across the valley of the I'lí to Almaty. From Vernoë, round the south-eastern extremity of the Issyk-kul (which is now a Russian lake), and up the valley of the I'lí River, and from the Irtysh to the mountain knot of the Tarbagatai, and other ranges in Mongolia, absorbing the Nor-Zaisan, the Russian appropriations date from 1865, since when also the Russians have absorbed the basin of the Ala-kul. The seventh decade of the present century opened with the seizure of Kuldja, and the Russians entered Kuldja "not for a single day, but for always," as General Kaufmann told the Taranchis of that district in 1871, when the city was occupied by his forces. There remains nothing to the Chinese which is worth preserving, and less still the recovery of which would repay the cost of a great effort. Even the valley of the I'lí, which is by far the most fertile and richest part of the country, is said to have been an expense instead of a source of profit to the Chinese during their tenure of it. Chuguchak and Kurkara Usu are the only places which the Chinese retain in Dzungaria. These, lying in two distinct isolated valleys, communicate with each other by a road leading over the mountain chain, which separates them; and with Kobdo or the country of the Khalkas, and from thence with China by a single track passing from the sources of the Emil to Bulun-Togai, and round the southern extremity of the Exktak-Altai to Ike-Aral Lake. Another route from Chuguchak runs due east over several high mountain passes into the valley of the Black-Irtysh; but the passes here are already commanded by the Russians at the Chagan Obo picket-post, and the road is so difficult that Chinese fugitives, during the rebellion in Dzungaria, preferred the southern and circuitous route to the much more direct but tedious one by the Mus-tagh or Icy Mountains.

The limits of this borderland, passed under review by Colonel Veniukof as a field of military operations, may be thus traced:—On the west the Balkhash, and a line from the mouth of the Ayaguz to Semipalatinsk; on the north the Irtysh, Narym, and Bukhtarma rivers; on the east a line from the sources of the Bukhtarma to those of the Kunges (the affluent of the I'lí); on the south the Tian-Shan, and Trans-I'lí Mountains from the sources of the Kunges through Santash to Khan-taù.

These limits will embrace on the Russian side that portion of the Semipalatinsk region which lies to the east of the road from Semipalatinsk to Sergiopol; and the portion of the Semirechensk region including the districts of Sergiopol, Kopal, and Vernoë with the entire valley of the Upper I'lí. On the southern side these limits embrace the Tarbagatai (Chuguchak) district in its entirety, and portions of the districts of Kurkara-Usu and Kobdo.

Within these limits is comprised a superficial area

* In his annotated edition of Ritter, Semenof dates Baikof's journey in 1657. Abramof, in his paper on Nor-Zaisan (vide *Journal of the Royal Geographical Society* for 1865), starts Baikof from Tobolsk to China in 1665.

† In Baikof's itinerary this river is called the Baska.

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of about 279,000 square geographical miles, of which barely 6000 are considered to be fit for purposes of cultivation. The most fertile tracts lie at the bases of the mountains, where the bulk of the population, within the Russian, as well as within the Dzungarian limits, is located. In the summer the nomads,—Kirghizes,—and Kalmucks, ascend the mountains to the higher pastures.

The central portions of the valleys are almost pure deserts, either sandy, as around the Nor-Zaisan, or marshy, as by the shores of that lake and those of Ala-Kul and Sasyk-Kul, and as along the banks of the Irtysh. Without irrigation the soil yields no produce, and rain falls in sufficient quantities only in the vicinity of the mountain ranges. These deserts have a clayish or argillaceous soil, and are either saline or sandy, and in general perfectly horizontal. The steppes to the north of the Tarbagatai with all this have fresh-water wells. The valley of the Black Irtysh is from 30 to 50 miles wide; it has the character of a steppe. The Irtysh is skirted by a jungle from 10 to 13 miles wide, in which the Kirghizes fix their winter quarters. Above Ak-tuibe the lands adjacent to the river are covered with oziers, in which also the nomads take shelter from the snowstorms. The basin of the Black Irtysh is completely separated from that of the Urungu or of the Ulungur Lake, which constitute an entirely distinct water-system. Between the Tarbagatai and the Dzungarian Alatau, the country is pure and very barren steppe, except, as has been observed in reference to the entire region, at the bases of the mountains, where the streams flowing down afford the means of irrigation. The Chubar Agatch hollow, occupied by the Lepsinsk military settlement, is the most fertile spot in this part. The Kopal or Arasan elevated plain, 3200 feet above sea level, ranks next in degree of fertility by reason of a greater moisture. But the fertile lands between the Tarbagatai and the Dzungarian Alatau compose but about 1000 square geographical miles, or 1·40 of the entire area of this steppe, circumscribed as above.

To the south of the Karatal River and of the Dzungarian Alatau is an extensive depression, a sandy waste—a continuation of the desert of the Balkhash penetrating up the I'li, almost to the very walls of Kuldja, and leaving entirely bare even the banks of the I'li River. On approaching the Trans-I'li Alatau the soil improves, but it is only within a couple of miles or so of those mountains that it is found to be suitable for agriculture. Thus the district of Vernoë, with a superficial area of about 26,500 square geographical miles, comprises only 735 square geographical miles of land which can be utilized. The Kuldja district includes about 1470 square geographical miles of arable land, artificially irrigated. Here, in the very centre of the level part of the valley, the Chinese have reared forest plantations.

Atkinson, who professed to have traversed the whole of this region with a free pass from the Emperor Nicholas, and with some Russian Cossacks, gives one less of an idea of its character in his text than through his sketches, and according to these it would appear that it affords nothing but the grandest mountain scenery. He traces his course southward from Tarbagatai to Kur-Kara-Usu without appearing to fall in with the Dzungarian Alatau, which should have crossed his path, and although he skirted the desert along the Iren-Khabirgan, north-east of Kuldja, to the southern extremity of that range, and ventured across the Gobi "to the aül of the Sultan Sabeck," without ever seeing a single Chinese soldier, and even as far as the suburbs of Barkul, yet there is no idea conveyed in his narrative of steppe or desert, except in his searches for the nomad encampments.*

The Russian border lands, as will be seen from the above figure, illustrating the outlines of the mountain ranges, and from our description of the frontier, lie in the troughs of a sea of desert which may be rather called a strait between the Gobi and the Kirghiz Steppes. Such is also the case of the remaining Chinese districts of the Black-Irtysh, Chuguchak (Tarbagatai), and Kurkara-Usu; the mountain chains above mentioned representing the billows of this sea, with a roll, as it were, in a south-south-westerly direction from the south-western extremity of the Altai to the mountain mass enclosing the Issyk-kul. This section of the frontier, from the character of the country, is broken into three separate sections, which may be named after the water-systems which they respectively embrace or intersect. From the Kuitun mountain knot may be said to commence that progressive Russian frontier which extends westwards to the Caspian, with a vague or undefined limit in the south. On the Russian side the valleys or troughs open towards the north-west, and on the Chinese side, with the exception of the Irtysh and the Emil, the country widens out towards the south-east. In this division of the country between the Russians and the Chinese, the former have the greater advantage in the possession of the northern slopes of the mountains, which are covered with vegetation and forest growth, while the latter (except in Kur-Kara-Usu) face the northern declivities, which here, as is the rule throughout all the mountain systems which traverse this country, as well as farther west, are bare and almost utterly destitute of vegetation.

The strongest Russian positions are those on the Bukhtarma, from whence a descent might at any time be made on Kobdo, and the line of posts from Kopal to Lepsinsk. The troops in the basin of the Irtysh are under the command of the Governor of Western Siberia, belonging to the military circuit of Omsk, while the whole of the Zaisan prefecture, limited on the south and west by the line of the Tarbagatai, belongs to the Semipalatinsk district of Western Siberia. If the Chinese contemplated aggressive operations against the Russians, and beating the Russians at this point, advanced either down the Irtysh or on Ayaguz, or if their attack came from Chuguchak in the valley of the Emil, the region to the south could be entirely cut off from Russia, since they could intercept the Russian communications with Western

* *Oriental and Western Siberia and Chinese Tartary.* Semenof in his preface to a Russian edition of one of Ritter's volumes on Asia reflects strongly on Atkinson's veracity, showing how impossible it must have been to have performed the journeys described by Atkinson, and stating that the information he (Semenof) had gathered in Siberia from the Cossacks who had accompanied Atkinson, and from the officials who had provided the latter with escorts, tended to throw discredit on his narrative. A translation, by Mr. John Michell, of M. Semenoff's interesting preface will be found in the *Journal of the Asiatic Society* either of Calcutta or Bombay for 1865; also in the *Journal of the Royal Geographical Society* for that year.

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Siberia along the only existing line from Vernoë to Semipalatinsk. Force is lent to this observation from the fact that the line of communication between Vernoë and the region of the Jaxartes is too extended to be relied upon. On the other hand, it loses force from the counter fact of the absence of Chinese military forces in this region, a circumstance which Colonel Veniukof says, simplifies the problems which the Russians have to solve in the strengthening of their defences along the Dzungarian line. The depôts of artillery are at Ust-Kamenogorsk, Sergiópol, Kopal, and Vernoë, where there are regular fortresses—that of Ust-Kamenogorsk being however vacated. There is a *tête-de-pont* on the I'lí River at the ferry near the mouth of the Tolgar (north-east of Vernoë). All the supplies for the troops, clothing and ammunition, are brought from Omsk and Tashkend. Powder is brought from Kazan (a distance of 1700 to 2330 miles), and shot and cartridges from the Ural (800 to 1800 miles).

The annual provision of flour, grain, oats, and hay made for the frontier forces on this section does not exceed a total of about 800 cwts., at an average price of 4*l.* the cwt. The cost of transit in the spring and autumn, which are the most favourable seasons for transport, as well as for the movement of troops, is ordinarily calculated at 6 roubles the pood for every 100 versts (about 67 miles).

Unity of action among all the military authorities on the Dzungarian line has always been found impossible, and it cannot be established until telegraph wires are laid from post to post. But even then the various detachments in the different valleys, which are so many distinct fields of operation, must act independently of each other, as each, in attack or defence, will be guided by circumstances quite apart from those which may weigh with the others. But the isolation of the forces—say in an aggressive advance—will increase still more. Supposing a force be sent in one direction up the Irtysh and to Kobdo, where there must be another division of the troops, while a second will have to operate in the valley of the Emil, and occupy the passes leading from the south to Chuguchak; a third will operate from Kuldja, marching upon Kur-Kara-Usu, sending out detachments to guard the passes over the Tian-Shan; while a fourth, having for its basis Karakol, at the eastern extremity of the Issyk-kul, will have to keep guard in the valley of the Tekes. And, although this latter constitutes part of the Tian-Shan section of the line, it is under the surveillance of the general officer at Vernoë, who has command of all the troops from the Tarbagatai to south and west of Issyk-kul. Operations with large bodies of troops are here impossible, and the gradual colonization, and at the same time the expulsion of the native population, is the surest and the only means by which this line can be permanently consolidated. On the other hand, a well-organised Chinese or native combination against the Russians might lead to the entire expulsion of the Russians from the country under consideration. Of this there is, however, no fear; the Russians, in the prime of their military life, are far too vigilant to allow themselves to be surprised by any sudden movement of the Kalmucks or Taranchis, who have, moreover, no grievance against them. While the Chinese, notwithstanding their rumoured intention of recuperating their losses, give no sign as yet of anything which need cause the Russians any alarm. It may indeed be expected that, should there be the least foundation for a report of an advance in force of the Chinese for the recovery of their lost provinces, such a movement would be anticipated by the Russians in the seizure of Chuguchak, and in the interception at Kur-Kara-Usu, or even at Urumchi, of the army of the Celestials. It is hard to believe that Kuldja will ever be restored to the Chinese, for it stands in the valley of a river which intersects, at right angles, the only line of communication between Vernoë and the basis (Semipalatinsk) of all the military positions on the Dzungarian line. Should the rumour of the intentions of the Chinese prove correct, the Russians will then have first to deal with them, giving, most probably, a good account of their own selves; then will naturally succeed the question of frontier relations with the Amîr of Kashgar.

The Russian settlements in this border-land, are chiefly along the Irtysh and its right affluents, on the northern slopes of the Dzungarian Alatau, and at the northern base of the Trans-I'lí-Alatau. There are detached settlements at Kokbekty, on the Kurchum, at the Zaisanski post, at Urdjar, Bakty, and Borokhudzir. The settlers are principally married soldiers, of line regiments and Cossacks, and they all number —peasants and troops—in the aggregate 37,000 individuals, of whom, not more, however, than 12,000 are scattered along the advanced line between the Irtysh and the I'lí.

A few words here on the earlier history of this country. Dzungaria, with the I'lí, appears to have been originally inhabited by a people called Ou-Sun, distinguished from the neighbouring nations by having blue eyes and red beards. These, about the sixth century, were expelled by a Turk people, who, after remaining masters for several centuries, yielded to the victorious arms of Genghiz-Khan and his "blue" Mongols. The Mongols broke up into two great divisions—Mongols proper and Eleuths or Kalmucks —the former having, for a considerable time, the sway over the latter, until at last the Kalmucks threw off the yoke, when one of their tribes, that of Dzungar, gave its name to the country and to its people. Towards the end of the 17th century, Kanghi, the second emperor of the Tsing, or pure dynasty, extending his dominion even to Badakhshan and Khokand, effected the conquest of the Eleuths or Dzungars and their country. Under Arabdan, the Dzungars, however, recovered their independence. Arabdan, dying in 1720, was succeeded by Amursana, who, having put down Tavatsi, a second claimant to the khanship—with Chinese aid, 1755—turned traitor to China, and defeated two Chinese armies sent against him. He succumbed, however, on a third attack, in the reign of Kien-lung, 1757, and died in Tobolsk in the same year. It was during these wars that Dzungaria was depopulated. One million Eleuths are said to have been put to the sword in 1754, while the bulk of the Turguts of Kobdo, removed to the banks of the Volga.* It was at the period to which we have brought this relation that the Russians first came into contact with the Chinese on the borders of Dzungaria. Hastening to seize what they could,

* This event, as well as the history of the Chinese Embassy to the tribe inviting its return, are described by Gerbillon.

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ere the Chinese had consolidated their conquest, the Russians advanced their line from Ust-Kamenogorsk up the Irtysh, and extended it along the Ishim through the Kirghiz steppes.

There are now no large Chinese centres of habitation in front of the Russian lines. Chuguchak is still for the most part in ruins. The Tungan population was driven out in 1867 by the Taranchis, and removed to Urumchi; the natives of Bakty have even carted away from Chuguchak loads of bricks for Russian buildings. Kur-Kara-Usu remains in a state of utter demolition. Bulun-togoi,* at the head of the sources of the Black Irtysh, which is the residence of the Kalmuck chief—Chagen-Kegen—and Tulta, in the valley of that river, are insignificant places. Djin-ho and Takianzi, lately visited by Mr. Dilke, are small settlements of the remnants of the Chinese population of I'lí, which have sprung up since the rebellion of the Tungans and Taranchis.† The native population of the country within the limits herein described, consists of Kirghizes, Kalmucks, Taranchis, and Tungans. The Kirghizes number 580,000 individuals. The Kalmucks, divided into Turgouths, Tourbeths, Hoshoits, and Hoits, make a total of 320,000, of whom 200,000 remained faithful to the Chinese, but have scattered over various parts of the country. The first named are the most numerous; they comprise 120,000 individuals, and can place in the field 12,300 horsemen. They are governed by Chagan-Kegen, who is at one and the same time their administrative chief and spiritual pastor, who, in enforcing obedience in all things, invokes the higher authority of the Hut'ukh'tu. These people are Buddhists, and have always been foes to the Mussulman Kirghizes; they are nomads also, but not in an equal degree with the latter.

The Taranchis, who came next in point of numbers, compose a body of 39,000 individuals, principally grouped in the valley of the I'lí. These people were originally transplanted from Eastern Turkistan, chiefly from the district of Kharashar, by the Chinese, in the reign of Kien-Lung. They resemble in their mode of life the Sarts of Turkistan, but their language is of Turk not of Persian origin. The name Taranchi admits of several interpretations: in its simple form the word taran means millet; taranchi signifies field labourer, and may be taken also to mean "people of the bloody sweat;" and this appellation of the people seems to have attached to them since the Chinese first planted them in Dzungaria, and made them the hard-working slaves of their military colonists. On the outbreak of the Muhammadan rebellion in the North-Western Provinces of China in 1863, these people first joined the Tungans, who, sending a wing of their army into Dzungaria, aided these slaves to throw off their Chinese yoke; the Taranchis then turned on their allies, massacred a large number of them and drove the rest, with few exceptions, out of the country.

The Tungans number not more than 4,700 individuals in this region. These are now grouped in four settlements, of which Suidun is the principal one. These people who are of Turkish origin, and Muhammadans, stirred up the rebellion in Hansu, which ultimately ended, in 1864, in the severance from China of all Eastern Turkistan. Having succeeded in upsetting the Chinese authority, the Tungans of Dzungaria sought to establish relations with the Russians, but the representations which they made to the Russian Government in this matter were unheeded. A quarrel breaking out in Dzungaria in 1867, between the Taranchis and the Tungans, the latter were beaten in several engagements* and withdrew, some to Manas and Urumchi, others to fortified settlements to the north-west of Kuldja; but in 1871, before the Russians occupied Kuldja, these were nearly all annihilated by the Taranchis. The animosity of these two people to each other has not been explained; they spring, it is true, from distinct races; the Taranchis appearing to be the descendants of those Eleuths whom the Chinese deported to Eastern Turkistan, and reimported later into Dzungaria, when the latter country was depopulated by constant wars and wholesale massacres; but there is among both the tradition of a common home in Eastern Turkistan; the memory of the first deportation of the Eleuths is probably lost in the later recollection of their subsequent removal, and both Taranchis and Tungans are devoted followers of Islam.

Besides all these races, there are Sibos and Solons, Chinese, Manchus, and Chakhars, of whom there were on the Russian territory about 30,000 in 1871; 15,500 Solons have settled in the Kuldja district, while another portion of this people have adopted the Russo-Greek religion, and have settled on the Sarkan, being turned into Cossacks.

Colonel Veniukof names fifteen routes through Dzungaria, the most interesting of which are two to Kobdo from the Zaisanski post: the more northerly one leading through Ak-tuibé up the Irtysh to the sources of the Kiran on which Tulta is situated, thence across the Extak-Altai,† and the other passing round the southern extremity of that range. The road from Chuguchak to Urumchi (422 miles)—the old Chinese posting road—is easy; it passes through a now desolated country. The route from Kuldja to Chuguchak, through the Kaptagai gorge (270 miles)—the former Chinese military route—is fitted only for pack animals; but at lake Sairam it falls in with the carriage road from Urumchi to Kuldja.

From Kuldja to Kur-Kara-Usu, Manas and Urumchi (472 miles) over the Talk Pass, the road is practicable for wheeled carriages. Once well lined with settlements, this route also passes now through a desolated country. The distance from Vernoë to Kuldja is, by one road, across the Charyn, 240 miles; by another, fording the Telek, and encountering no sands, 270 miles. From Vernoë to the Muzart Pass—over the Merké plateau—the distance is 263 miles, traversable only by pack animals. From Karakol on Issyk-kul to Kuldja over Ketmen Pass, 183 miles. Kuldja is distant from Aksu, 361 miles. The route, which leads over the Muzart, is so difficult that horses have to be led most carefully by the bridles. Captain Shepelef, in 1872, traversed this pass, and has described it as being so very difficult that in some parts the packs have to be taken off the horses' backs and carried over the ledges

* This place has suffered from Amîr Yakub's Tungans, who, in November, 1873, scoured the country from Urumchi to Kobdo and Bulun-togoi.—*Journal de St. Petersbourg*, No. 84, 30th March (11th April).

† To this subject we may have occasion to refer in greater detail on another occasion.

* Vide *Journal de St. Petersbourg*, 1/13th March, 1856.

† Here are two passes, the Sunduruk and Hairatu.

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of the rocks; and in others, on the southern side, where there is an "immense sea of ice," the horses have to be let down the steeps by means of ropes. Recent discoveries have thus fully corroborated Chinese accounts of this pass. (Vide pp. 53, 54, *Histoire de la Vie de Hiouen-Thsang*, by Stanislas Julien.) After the occupation of Kuldja, immediate steps were taken by the Russian authorities, to ascertain the nature of the passes leading to Kashgaria. The passes examined were the Muzart, Kok-su, Dagyt and Narat, all excepting the first, leading into the basin of the Yuldus, or head-water of the Khara-Shahr River.

A few observations on the two great rivers which run through this section of the frontier, and we will proceed to a conclusion, briefly noticing the Russian travels through Western Mongolia. The Irtysh is navigable to Nor-Zaisan; the mouth of the Black-Irtysh is almost closed with shallows, and upwards the river can bear boats drawing only 2 feet as far as Ak-tuibé. Above the latter point the fords are numerous, but the course of the upper stream has not been explored. The lake is deep and navigable, the only drawback being its flat shores, which preclude the use of keel-bottomed vessels. Full particulars of this lake will be found in Abramof's paper (see *Journal of the Royal Geographical Society* for 1865; and see Abramof's paper on Semipalatinsk for many interesting particulars with reference to Kuldja and Chuguchak, *Journal of the Royal Geographical Society*, vol. xxxii., 1862).

The I'lí was partially explored by Mr. Fisher in 1872, when it was found that between Old and New Kuldja boats of only 2½ feet draught could be floated upon it, and that, too, only in flood time (twice a year); below Old Kuldja to the I'lí (281 miles) settlement, boats of that capacity can pass at all times. Mr. Dilke says that opposite Kuldja the river is very wide and deep and swift, and that it is intended to introduce two little steamers on it, but up to what point the river is navigable he does not state (see *Proceedings of Royal Geographical Society*, No. 29, 1874).

According to Mr. Fisher, it takes forty days to tow a boat up from the I'lí settlement to Borokhudzir (147 miles).

Mr. Helmersen, in 1869, communicated to the Imperial Russian Geographical Society of St. Petersburg an interesting report of a journey to Chuguchak and Kobdo, performed by Lieutenant Arefius Nesnaef in the year 1771. He also produced a map, bearing date 1724, which, with the document referred to, he had found in the military archives. It appeared from an inscription on the map that it was a result of three journeys performed by different Russian officers, viz., that of Nesnaef to Kobdo; that of Major Zelenof in 1784,* "from Katun fort through the former Dzungarian dominions to the Chui, Tandjila and Tengi Rivers, over the Altai to the Bukhtarma and so back to Ust-Kamenogorsk;" and that of Major Bogdanof, "from Ust-Kamenogorsk to the Tarbagatai." Nesnaef, on reaching Chuguchak, was turned back by the Chinese, who told him that for the execution of his mission he should go by the Narym, which he accordingly did, traversing the Suok Pass. Mr. A. Printz, who travelled to Kobdo in 1864, and surveyed the route over the Suok, was, therefore, not the first European, as he says he was, who performed this journey. In recent times, namely in 1873, Mr. Matusofski made an instrumental survey of the country, as far south as Bulun-togoi; Russian traders have already accompanied caravans to Kobdo, but to Khami and Barkul no one has as yet ventured, although the information collected by the Russian authorities at Vernoë and Kuldja enable the Russians to form a tolerably accurate conception of the country. It may be observed that if the Russians have seldom displayed a spirit of adventure by passing far beyond the protecting lines of their own Cossacks, they have done much in concert with numerous German naturalists and explorers to verify the determinations of the old Jesuit fathers. They have done even more than this. Several eminent Russian sinologists have made translations or abstracts of various Chinese histories and accounts of travel, with which the journals and "proceedings" of the Russian Imperial Geographical Society have been so full for the last ten or fifteen years.

Colonel Veniukof, who deserves no small praise for his eminent services in the cause of geographical science, has himself published numerous articles, having travelled far and wide in North-Eastern Asia. In 1861, for instance, he published a highly interesting paper entitled "Sketches of the Trans-I'lí Region and of the Country of the Chu River," to which he appended a long and valuable list of routes and a long list of astronomical points, taken by the well-known M. Zakharof, from the books of Si-yu-tu-chi and Si-yu-shui-doi-tsi, which comprised the results of the observations made by the Catholic missionaries in the years 1775 and 1759.

ROBERT MICHELL.

* Evidently a misprint.

ADVENTURES IN MOROCCO AND JOURNEYS THROUGH THE OASES OF DRAA AND TAFILET. By *Gerhard Rohlfs*. (Sampson Low, 1874.)

THIS book is a translation of articles published in the *Ausland* and other German periodicals, several years ago; and is an account of the author's travels, in the disguise of a Muslim, through portions of Morocco. The work is entirely wanting in exact geographical information, and is unreliable as a guide to history. Thus, in the chapter on Consulates, it is stated that, in 1852, "the English Admiral Napier was sent for the purpose of revenging insults offered to British subjects." Here the author is wrong both in his date, and as regards the object of the service to which he alludes. Next we are told that Prince George of Hesse Darmstadt captured Gibraltar for England! More authentic history mentions one Admiral Rooke, and tells us that Gibraltar was captured, so far as Prince George was concerned in the operation, for a certain titular King Charles of Spain. Similar blunders occur in this and other chapters; while the narrative is dry and uninteresting. The account of the really new and important journey made by the author to the south of the Atlas range from Agadier on the Atlantic, by the Draa oasis and Tafilet, to Algiers, is particularly disappointing. It is contained in fifty meagre pages at the end of the book. We do not consider that these old papers were worth the trouble of translation; and if a new book was to be made out of them, the total absence of all allusion to their former publication is unfair to the reader. The orthography is bad and inconsistent, but at least the names of places might have been spelt in the same way on the map and in the book. Everyone has heard of the Sallee rovers. The place is spelt *Sla* in the book and *Sallee* on the map. We have *Arbat* in the book, and *Robat* on the map; *Asamor* in the book, and *Azamore* on the map; with many similar inconsistencies.

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THE ENGLISHMAN'S ILLUSTRATED GUIDE BOOK TO THE UNITED STATES AND CANADA. (Longmans, 1874.)

THE author of this little work, after travelling over all the routes he describes, has succeeded in preparing a very excellent guide, full of all necessary information, and in a convenient and portable form. It includes an account of the Yellowstone National Park, and of the Yosemite Valley; and a very comprehensive statistical appendix, which gives the work considerable value as a book of reference, apart from its usefulness as a guide.

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A MANUAL OF BOTANY, ANATOMICAL AND PHYSIOLOGICAL, FOR THE USE OF STUDENTS. By *Robert Brown, M.A., Ph.D. F.L.S., F.R.G.S., &c.*

DR. BROWN has undertaken a laborious, and at the same time a most useful work; and he has brought to the task a mind well-stored with botanical knowledge, and a habit of accurate and conscientious research. In the second volume, which is not yet published, there will be a history of the science, a description of the economic and medicinal plants, and the laws regulating the distribution of plants over the world will also be explained. This, therefore, will have the most interest for geographers, but the present volume also deserves their attention, for a knowledge of the anatomy and physiology of flowering plants is essential to an intelligent study of their geographical distribution. In the first volume of Dr. Brown's Manual we are given sections on the anatomy of the elementary tissues of plants, on nutrition, on reproduction, and on general phenomena connected with plant-life. In the latter section the chapter on germination, and on the vitality of seeds, deserves the special attention of geographers; for there is no point of greater importance, in connection with the laws of plant distribution. This first volume is well illustrated, and is a comprehensive and excellent text book. We look forward, with pleasure, to the appearance of its successor, which, while it cannot fail to be prepared with equal ability and care, will have a more special interest for geographers.

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AFRICA: GEOGRAPHICAL EXPLORATION AND CHRISTIAN ENTERPRISE. By *A. Gruar Forbes.* (Sampson Low, 1874.)

THE author of this little book has set himself the task of condensing into a small compass the information contained in the numerous books of African travel that have appeared of late years, with the object of furnishing a distinct and definite conception of what has been accomplished, and of what has been attempted in the way of discovery. He commences with an allusion to the early labours of the African Association, which might, with advantage, have been made somewhat more circumstantial and complete. The account of Tuckey's Expedition up the Congo, the only one which has ever reached the river above the rapids, is also too meagre even for a sketch of this kind. The general results might at least have been given, if only in a few lines. Denham, Clapperton, and Lander, are dismissed in less than a page; and the rest of the introductory chapter is occupied with a general account of African geography. The bulk of the work is a condensed sketch of the travels of Livingstone, Burton, Speke, and Baker; and is not, on the whole, a satisfactory production. The idea was good, but the execution is wanting in perspicuity and lucid arrangement; and there is an absence alike of due proportion in the details and of unity in the general design.

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WESTWARD BY RAIL; A JOURNEY TO SAN FRANCISCO AND BACK, AND A VISIT TO THE MORMONS. By *W. F. Rae.* (Isbister, 1874.)

MR. RAE takes his readers by the Pacific Railway, across the Prairies, over the Rocky Mountains, to the City of the Saints, the capital of the Golden State, and the Queen City of the Pacific. They will find him a very agreeable and well informed companion; and on his return journey, he introduces them to the City of Boston, and Harvard University, and conveys his impressions of America and the Americans. The introductory chapter contains some useful information respecting the Californian mines, the vicissitudes of the Mormon settlement, and the development of traffic across the Pacific railway.

Correspondence.

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To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—I beg to offer a few remarks on a question suggested by Mr. Michell's paper in the June number, p. 113. It is there said or implied, I do not quite make out whether as a quotation from Veniukof or not (but I believe it comes originally from Ritter), that the Belasaghun of the Muhammadan historians and geographers was the same as Karakorum. This is greatly to be questioned.

That Belasaghun was a corruption of the Mongol Balghassun, "city or royal residence," as is intimated in the same passage, seems highly probable; but I think we must look for the place so called a good deal to the west of Karakorum. It is, I believe, chiefly mentioned in connection with the brief empire of Karakhitai (1125-1213). This empire was founded by a prince of the Khitan dynasty of Leao, who escaped with a body of followers from Northern China on the overthrow of that dynasty by the Kin (or Golden Kings of Marco Polo) in the early part of the 12th century. They first established themselves at Imil, supposed to have been in the Tarbagatai territory near lake Ala-Kul. A khan, "of the race of Afrasiáb," was then dwelling at Belasaghun, and was much harassed by the tribes of the Karlík, the Kipchák and the Kánkli. He sent to beg help from the Prince of Karakhitai, begging him to come to his capital where he would make over all authority to him. This the Prince of Karakhitai did, subdued the obnoxious tribes of Turks, and then proceeded to conquer Kashgar, Khotan, and Bishbalik.*

The position of the great tribes of Kipchák, Karligh and Kánkli is known, and lay, speaking roundly, along the north of the Caspian, the north of the Aral, and the north of the Jaxartes, as far east as Issikul. By the story, Belasaghun should lie somewhere between these and Imil, probably therefore somewhere about the valley of the I'lí. Al-Biruni places it in longitude 91° 50', or not far beyond Taraz, a position which, however loose, is inconsistent with its being in remote Mongolia. There are other indications less definite bearing the same way. In *Cathay and the Way Thither*, I had placed Belasaghun hypothetically much further east, and to the north of Kamul, but a note of Professor Vámbéry's in his *History of Bokhara* (German edition, I. 126), showed me that this was incorrect.

H. YULE.

PALERMO, *June 17th*, 1874.

* See Oppert's *Presbyter Johannes*. First edition, pp. 127, 130, 131, 132, 156; *Spienger's Post und Reise routen*, p. 19 and Map No. 2. D'Ohsson I have not at hand.

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Bibliography.

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PHYSICAL GEOGRAPHY.

SAMMLUNG gemeinverständl. wissenschaftl. Vorträge. Hsg. von A. Virchow u. F. von Holtzendorff. Berlin, 1873.

3. H. W. DOVE, der Kreislauf des Wassers, pp. 39. 9d.

9. J. ROSENTHAL, von den Elektrischen Erscheinungen, pp. 32. 9d.

38. K. VON SEEBACH, der Vulkan von Santorin, pp. 32. 10d.

192. GEISENHEIMER, Erdmagnetismus u. Nordlicht, pp. 28. 7d.

CHAMBRUN DE ROSEMONT (A. de) Etudes Géologiques sur le Var et le Rhone pendant les périodes tertiaires et quaternaires, leurs deltas, la période pluviaire. Le Déluge. 7 Plates and Map. 8vo., pp. 132. Nice, 1874.

RENDU (Rev. Canon). Theory of the Glaciers of Savoy. Translated by A. Wills, edited by Geo. Forbes. With Memoir and Articles by P. G. Tait and John Ruskin. 8vo., pp. 216. London, 1874. 7s. 6d.

WIEGAND (A.), CORNELIUS u. SCHMOEGER. Mathematische u. physikal. Geographie nebst Chronologie. 1 Theil. Halle, 1874. 1s.

ERGEBNISSE der Beobachtungsstationem an den deutschen Küsten über die physikalischen Eigenschaften der Ostsee u. Nordsee. Jahrgang, 1873. Veröffentl. v. d. Kommission zur Untersuchung der deutschen Meere, Fol. 12s.

DRITTER BERICHT d. ständigen Commission für die Adria an d. K. Akad. d. Wissenchaften, 1870-72. Red. v. Dr. I. R. Lorenz, 4to., pp. 172. Vienna, 1873. 10s.

SCHLEIDEN (M. J.). Das Meer. 2nd ed. Illustrated. Berlin, 1874. In parts at 2s. 6d. (Ten published.)

SERPIERI (A). Il terremoto d'Italia del 12 marzo 1873 e legge e fenomeni comuni a molti terremoti. 8vo., pp. 74. Urbino, 1873.

METEOROLOGY.

MAGNETISCHE u. meteorol. Beobachtungen auf d. Sternwarte zu Prag, 1872, hsg. von C. Hornstein. 4to., pp. 63. Prag, 1874. 7s. 6d.

ANNUAIRE meteorologique de l'observatoire de Montsouris, pour 1874. 18mo., pp. 308. Paris, 1874. 1s. 8d.

MAYER (A. M.) The Earth as a great Magnet : A lecture delivered February 14, 1872 (University Series, No. 9). 8vo., pp. 474. Newhaven. 1s. 6d.

WISE (Prof.) Through the Air : a Narrative of Forty Years' Experience as an Aeronaut. 8vo.. pp. 650. Philadelphia. 18s.

LORENZ (Dr. J.) u. ROTHE (Dr. C.) Lehrbuch der Klimatologie m. besond. Rücksicht auf Land u. Forstwirthschaft. Mit Vorwort von H. W. Dove. 14 Plates and 48 Woodcuts. 8vo., pp. 492. Vienna, 1874. 15s.

ANTHROPOLOGY.

HAEKEL (E.) Ueber die Entstehung u. d. Stammbaum d. Menschengeschlechts (Nos. 52 and 53 of Virchow and Holtzendorff's Sammlung gemeinverst. Vortraege). 8vo., pp. 80. Berlin, 1873. 1s. 6d.

GEIKIE (Ja.) The great ice-age and its relation to the antiquity of Man. 8vo., pp. 580. London, 1874. 24s.

PESCHEL (O.) Völkerkunde. 8vo., pp. 580. Leipzig, 1874. 11s. 3d.

BARTH (Dr.) Rapport sur les épidemics du choléra-morbus en France, 1854 et 1855. 4to. Map. pp. 132. Paris, 1874.

EUROPE.

BLACK (C. B.) Guide to Holland, the Rhine, and the baths and mineral waters in Alsace, and the valley of the Rhine. Maps. 12mo., pp. 94. London, 1874. 2s.

SYMONDS (J A.) Sketches in Italy and Greece. Reprinted from the "Cornhill," and "Fortnightly." 8vo., pp. 340. London, 1874. 9s.

BRITISH ISLES.

CENSUS of England and Wales, 1871. Vol. IV. General Report. Parl. Paper 872 I., Session 1873. Folio, pp. 450. London, 1874. 4s. 8d. Contains Abstracts on Population of Colonies, &c.

CENSUS of Ireland, 1871. Vol. I. Province of Leinster. Summary Tables. Parl. Paper, 562 XIII., Session 1873. London, 1874. 2s.

LOCAL TAXATION (England and Wales) ; Returns for 1871-2. Parl. Report, 344. London, 1874. 1s. 6d.

HEATH (F. G.) The English Peasantry. 8vo., pp. 280. London, 1874. 7s. 6d.

COLLINS's Illustrated Guide to London and Neighbourhood. Illustr. 12mo. London, 1874. 1s.

FRANCE.

LAMAIRESSE. Etudes hydrologiques sur les monts Jura. 4to., pp. 176. Plates. Paris, 1874.

DU CAMP (M.) Paris, ses organs, &c. Vol. V. 8vo., pp. 528. Paris, 1874. 6s. 3d.

JOANNE (A.) Pyrénées (Guide Joanne). Maps. 32mo., pp. 344. Paris, 1874. 2s. 6d.

PAYOT (V.) Géologie et minéralogie des environs du Mont Blanc, &c. 8vo., pp. 84. Basil, 1873. 1s. 10d.

FOUQUET (A.) Guides des tourists et des archéologues dans le Morbihan. Nouv. ed. profondément modifié. 18mo., pp. 204. Vannes, 1874. 1s.

FERET (Ed.) Statistique générale topographique, scientifique, administrative, industrielle, commerciale, agricole, historique, archéologique et biographique du dép. de la Gironde. II. Division. 242 illustrations. 8vo., pp. 938. Bordeaux, 1874. 12s.

BOISTIER (D.) Guides des Alpes maritimes et de la principauté de Monaco. 8vo., pp. 672. Nice, 1874. 6s.

JOANNE (A.) Géographie du département de la côte d'or. Map, and 29 illustrations. 18mo.; pp. 76. Paris, 1874. 9d.

RECLUS (O.) Géographie de la France, et de l'Algerie et des Colonies. 2e ed., revue et augmentée. 18mo., pp. 520. Paris, 1874.

GERMAN EMPIRE.

STATISTIK d. deutschen Reichs. Hrgs. v. Kais. statist. Amte. Vol. 4. 8vo. Berlin, 1874. 8s.

VOLLERT (Dr. A.) Statistik d. Rechtspflege im J. 1872 f. Sachsen-Weimar, &c. 8vo., pp. 112. Jena, 1874. 3s.

LANG (G.) der Regierungsbezirk Lothringen. Statistisch-topographisches Handbuch. 8vo., pp. 358. Metz, 1874. 4s. 10d.

SCHELBERT (J.) das Landvolk des Allgäus in seinem Thun u. Treiben dargestellt. 16mo., pp. 200. Kempten, 1874. 1s.

AUSTRO-HUNGARY.

NACHRICHTEN über Industrie, Handel u. Verkehr aus d. stat. Dep. im Handelsministerium. In parts. Vienna. Vols. I to V., as far as published. 22s. 8d.

UEBERSICHT der Ein-und Ausfuhr d. oesterreichisch-ungarischen Zollgebiets im J. 1872. Hrgs. v. stat. Dep. im Handels-ministerium. 4to., pp. 72. Vienna, 1873. 2s.

RASCH (G.) Touristen-Lust aind Leid in Tirol. Tisoler Reisebuch. 8vo., pp. 405. Stuttgart, 1874. 5s. 6d.

PEYRER (C.) Fischereibetrieb u. Fischereirecht in Oesterreich. Verfasst im Auftrage d. Ackerbauministeriums. 8vo., pp. 160. Vienna, 1874. 4s.

MAJOR (P.) Statistische Tafel d. landwirthsch. Verhältnisse Ungarns. Imp. fol., Vienna, 1874. 1s. 3d.

SIMIGINOWICZ-STAUFE (L. A.) die Bodenplastik der Bukowina. 8vo., pp. 46. Kronstadt, 1874. 1s.

SWITZERLAND (AND ALPS).

KINKELIN (Dr. H.) Statistik d. Unterrichtswesans in der Schweiz im J. 1871. 1 Theil. 4to., pp. 132. Basel, 1874. 4s.

ALPINE JOURNAL. By Members of the Alpine Club. Vol. 6. 8vo. London, 1874. 14s.

WARTMANN (H.) Atlas über die Entwickelung von Industrie u. Handel der Schweiz 1770-1870. Im Auftrag d Commission f. die Ausstellung in Wien. Folio. 7 maps and letter-press. Winterthur, 1873. 26s.

SCANDINAVIA.

DARGAUD (M.C.) e NOGARET (N.) Viaggi in Danimarca e nell interno dell Islanda. 8vo., pp. 232. Illustr. Milan, 1874. 2s. 6d.

ITALY.

STATISTICA generale del regno d'Italia. Censimento degli Italiani all'estero. 4to., pp. 266. Map. Rome, 1874.

FISHER, Reise n. Italien bis zum Vesuv u. Pompeji. Vorgetragen im Gewerbevercin zu Erfurt. 8vo., pp. 24. 7 Plates. Erfurt, 1874. 6d.

ITALIEN. Eine Wanderung von den Alpen bis zum Aetna. In Schilderungen von K. Stieler, E. Paulus u. W. Kaden, mit Bildern von G. Bauernfeind, A. Calame u. A. Stuttgart, 1874. Published in parts at 2s.

GEOGRAPHIE du pays d'Aosta, par la petite societé Alpine de Cogne. 32mo., pp. 344. Aosta, 1870-74.

ANNALI del Ministero di Agricoltura, Industria e Commercio. 8vo., pp. 400. Rome, 1874.

Do. Vol. II., part I. (Fisheries). 8vo., pp. 758. Genoa, 1874.

SPAIN.

DAVILLIER (Baron C.). Viaggio in Ispagna ; (with 300 designs by Doré,) 4to., pp. 624. Milan, 1874.

VISCAYA ; a Life in the Land of the Carlists at the Outbreak of the Insurrection, 1872-3 ; with some account of the Iron Mines in the vicinity of Bilbao. Map and Sketches. 8vo., pp. 206. London, 1874. 9s.

RUSSIA.

HANSEN (R.) Anteckningar gjorda under en antiquarisk forkiningsresa sommaren 1870 Vestra Nyland. 8vo., pp. 58. 19 Plates. Stockholm, 1873.

HANSEN (R.) Anteckningar, etc. 1871 i-egentliga Finland samt pa Aland. 8vo., pp. 82. 9 Plates. Stockholm, 1873.

LINDFORSS (C.M.). St. Petersburg och dess omgifningar. Vägledning för fremlingar. 8vo., pp. 203. Map, Helsingfors, 1873.

TURKEY.

SCHWEGEL (V.) Volkswirthsch. Studien über Constantinopal u. d. anliegende Gebiet. 8vo., pp. 482. Illustrations. Vienna, 1873. 6s. 7d.

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Cartography.

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Kiepert's Physical Wall Maps.*

IT is very much to be regretted that the pecuniary resources required for improving the position of our schoolmasters, and for furnishing our national schools with the requisite aids to instruction, are not forthcoming as freely as are the vast sums expended upon armaments and well-paid civil functionaries. Apologists will always be found when it is a question of attending to so-called material interests, or even to administer to vanity or luxury, but our educational establishments have to be conducted on the most economical principles; they are refused the material support which alone would enable them to do their work efficiently, and the results attained by them are consequently far less satisfactory than would be the case under more favourable circumstances. Geography is that branch of instruction in which we are peculiarly interested. It can be conducted only with the aid of good maps, and other illustrations, yet, what can be more disheartening than an inspection of the maps which are to be found in large numbers in our public schools. The wall maps are far from being ornaments to the school-room, as they might be, and the atlases placed in the hands of the pupils, possess only one quality to recommend them, namely cheapness. Cheapness, indeed, appears to be the guiding principle, whilst quality and scientific value are altogether disregarded. Yet there are not wanting school-maps, produced by scientific geographers, and calculated to meet every reasonable requirement; and, although these maps are necessarily more expensive than the wretched manufactures referred to, their price, looking to the quality of the work is still moderate, and ought not to deter the school authorities from introducing them. Amongst maps of this superior class we unhesitatingly place Kiepert's series of physical wall maps, which has been prepared under the auspices of the Berlin School Board.

These maps are designed to illustrate the great physical features of the globe, but, as many schools may not be in a position to acquire two sets of maps, the one physical, the other political, Professor Kiepert has inserted the names of the principal towns and the boundaries of states, and teachers are thus able to colour their maps politically. But, as Professor Kiepert very justly remarks, by doing this they will inevitably break up the continuity of physical features, and we trust the maps will be allowed to remain as published originally.

The fact of these maps constituting a series is rendered evident not only from the general treatment of the subject, but likewise by a certain uniformity of scale. Instead of first fixing upon the size of the paper and then forcing the country to be delineated within the margin thus arbitrarily created, Professor Kiepert has first of all chosen a suitable scale for his maps, upon which their size depends. The continents of Asia, Africa and America, are thus drawn on a scale of 1 : 8,000,000, and Europe on double that scale, and by these means an idea of the relative extent of countries is conveyed to the pupils, which maps, drawn to size, fail to convey altogether. It is undoubtedly of considerable importance that correct notions respecting the extent of various countries should be formed, and for this reason we hail with pleasure the two hemispheres, which have been substituted for a Mercator's chart, now so universally used; for the latter, though it offers certain advantages, and is a great favourite with many persons on account of its continuity, fails altogether where it is proposed to illustrate the relative extent of lowlands and tablelands. The author likewise deserves credit for having delineated with equal care the whole of the countries embraced within the margin of each map, instead of leaving large blanks, as is frequently done from reasons of economy. The map of Asia thus embraces the whole of Europe with a considerable portion of Africa, that of Africa the whole of Southern Europe with the Mediterranean and all Asia as far as the Caspian and the Persian Gulf, whilst Europe includes Western Asia and the Mediterranean.

The main object of the maps consists, of course, in a delineation of the orographical and hydrographical features, and the river systems, lakes, tablelands and mountain ranges are consequently shown with a considerable amount of detail. But in addition to these, we find the ocean currents on the two hemispheres, the northern limits of trees, of barley, wheat and oats, of the beach, of fruit-trees, the vine, the olive and the date-palm on the map of Europe; the northern limit of trees, of barley, of the vine, and of palms on that of Asia, the region of tropical rain, and on that of Africa; and the northern limit of trees, of foliferous trees, of maize, the vine, and of palms on that of North America. The maps of Asia, Africa, North and South America are supplemented, moreover, by political maps placed in the margin. The delineation of the orographical features forms, however, the most conspicuous feature. The lowlands (up to 200 m. on the hemispheres and the map of Europe, up to 300 m. on the map of America, and up to 400 m. on those of Asia and Africa) are left blank. The highlands are indicated by pale and dark tints, and the principal mountain chains are shaded in the usual style. This composite system conveys a far more vivid notion of the orographical feature of each country than would either a mere hypsographical map or a map with the hills shaded merely in the usual manner, for whilst the tints indicate the broad features and mass elevations in an unmistakable manner, the shaded hills supply details sufficient for purposes of instruction.

Geographical progress has become so rapid within the last few years that compilers of maps are hardly able to keep pace with it. Yet, on examining those before us, we are bound to acknowledge that note has been taken of the latest discoveries, and not only the lake region of Central Africa (with the Welle flowing to lake Tsad and Livingstone's Lualaba to the Congo), but also the region of the Upper Oxus are laid down in accordance with the latest information received. In conclusion, we are glad to be able to recommend this series of wall-maps to our teachers, and to assure them, that they will prove of material service in conveying a correct notion of the grand physical features of the continents.

* H. Kiepert's Physikalische Wandkarten (Physical Wall Maps).

Nos. 1 and 2.—Östlicher und Westlicher Planiglob (Hemispheres). 10 sheets. Size, 42 by 84 inches. Berlin, 1873. 10s. mounted; on rollers, 22s.

No. 3.—Europe. 1 : 4,000,000, 9 sheets. Size, 66 by 51 inches. Berlin, 1873. Price 9s.; on rollers, 19s.

No. 4.—Asia. 1 : 8,000,000. 9 sheets. Size, 66 by 51 inches. Berlin, 1873. Price, 12s. in sheets; 22s. on rollers.

No. 5.—Africa. 1 : 8,000,000. 6 sheets. Size, 44 by 50 inches. Berlin, 1873. Price, 8s. in sheets; 16s. on rollers.

No. 6.—North America. 1 : 8,000,000. 5 sheets. Size, 44 by 42 inches. Berlin, 1874. Price, 7s. in sheets; 14s. on rollers.

No. 7.—South America. 1 : 8,000,000. 4 sheets. Size, 34 by 42 inches. Berlin, 1874. Price, 6s. in sheets; 12s. on rollers.

Hypsographical Map of the Alps.

M. A. STEINHAEUSER, to whom geographers are already indebted for a large number of hypsographical maps of various portions of the Austrian Empire, has just published a map of this kind, which embraces the entire region of the Alps, from the Rhone in the west, to the

* Hypsometrische Uebersichtskarte der Alpen (1 : 1,700,000) aus den Arbeiten von Papen, Ravenstein, Berghaus, Ziegler, Streffleur u. A. zusammengestellt u. ergaenzt von A. Steinhaeuser. Vienna, 1874. Two editions, one tinted, the other with names.

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plains of Hungary in the east. The contours are laid down at intervals, vertically, of 1000 feet, and the country is tinted according to elevation, the darkest tints having been chosen to indicate the most elevated regions. No notice has been taken of glaciers, and very properly so, as their introduction would certainly have interfered with the purely hypsographical features, which the map is designed to illustrate. Nor have any names been inserted to mar the clearness of the design. The nomenclature, as well as the contours, in brown, but no tints, will be found on a companion sheet. There is no doubt that M. Steinhäeuser has succeeded in placing before us a very intelligible picture of the uplands and ramnifications of the Alpine system—this work, however, is altogether devoid of plasticity. Those curious to ascertain whether the desirable appearance of relief might be given to the map by employing a different system of tinting may make use for that purpose of the companion map referred to.

French Admiralty Charts.

THE *Dépôt de la Marine* is exhibiting an unwonted activity in the publication of charts, no less than thirty-six of which have been issued since the beginning of this year. It is true that most of these charts are merely French editions of the surveys made by other nations, particularly England, and that they do not, therefore, add to our stock of knowledge to the same extent as the less numerous, but more original, publications of the British Admiralty. Yet the Dépôt de la Marine deserves credit for placing within the reach of French sailors the results of the surveys carried on by neighbouring nations, and for popularizing and rendering more generally available the information collected. These French charts are somewhat inferior, as respects style of engraving and quality of paper, to the British charts, but their extraordinary cheapness compensates to a very great extent for this inferiority, and partly accounts for it.

Beginning with Europe, we find plans of Dover, Folkestone, and Boulogne,* a map of Heligoland,† and a chart of a portion of the coast of Norway.‡ The Mediterranean is represented by five sheets referring to the island of Sicily,§ by a chart of the channels between Greece and the island of Candia,‖ and by three sketch-charts of Cyprian roadsteads.¶ There is a chart of the harbour of the small island of Porto Santo, near Madeira,** and another of the island of Fernao Noronha.†† A small sheet is devoted to the delineation of some of the minor harbours on the south-western coast of Africa.‡‡ The island of Madagascar, which is growing in importance as a commercial field, has its geography elucidated by plans of five harbours on its north-western coast,* and these, as well as the sketches of portions of the Gulf of Siam,† and of the roadstead of Mitho, the capital of French Cochin-China,‡ are based upon original French surveys. The charts referring to the glorious Inland Sea of Japan,§ however, as well as those of certain roadsteads of Yeso and Saghalien,‖ are again based upon the labours of British or Russian seamen. The illustrations of the hydrography of the New World are confined on this occasion to three of the West India Islands, viz., Tobago, Santa Lucia, and the small passage island near Porto Rico.¶

E. G. RAVENSTEIN, F.R.G.S.

New Maps.

Berghaus (H.). Physikalische Wandkarte der Erde (Physical Map of the World on Mercator's projection). Gotha, 1874. 10s.; mounted 14s.

Carte de France dressée au Dépôt des Fortifications (Map of France prepared at the Dépôt of Fortifications) au 1 : 500,000. Sheet 5. Paris (Erhard), 1874.

Atlas cantonale de Maine-et-Loire (Atlas of the cantons of Maine and Loire), dressé par le service vicinal. Angers, 1874.

Les Nouveaux Forts de Paris (the new forts of Paris), par Erhard. Paris, 1874.

Carte des Etablissements de Sauvetage (Lifeboat Stations) au 1er Janvier, 1874, par Erhard. Publiée par la Societé Centrale de Sauvetage des Naufragés. Paris, 1874.

Map of European Russia, exhibiting the more important branches of production, based upon the 4 sheet map of the Statistical Department. Scale, 1:7,350,000. St. Petersburg, 1873. (In Russian).

Chekanovsky, Map of the Government of Irkutsk, published by the Siberian Section of the Russian Geographical Society (in Russian). Irkutsk, 1873.

Cubas (A. Garcia). Carta geografica y administrativa de los Estados Unidos Mexicanos (Map of Mexico) formado con presencia de los datos mas exactos y recientes. 9 sheets, 1:2,000,000. Mexico, 1873.

Garrarrete, Mapa elemental de la republica de Guatemala (Sketch map of Guatemala). Paris, 1874.

Gautherot (F.). Nuevo Mapa del Peru, segun los ultimos estudios (a new map of Peru). Paris, 1874.

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* Côtes sud d'Angleterre.—Port de Douvres, Port de Folkestone, Port de Newhaven, par Méa. Paris, 1874. 7½d. each.

† Mer du Nord.—Helgoland, par A. Martin. Paris, 1874. 10d.

‡ Mer du Nord.—Cartes des côtes ouest de Norwége entre Lille Feisten et Skudesnaes, par Morin. Paris, 1874. 1s. 8d.

§ Mer Mediterranée.—Sicile. Port de Syracuse, par A. Martin. Paris, 1874. 10d.

Sicile. Plan de Catane, par A. Martin. Paris, 1874. 7½d.

Sicile. Baie de Milazzo, par Martin. Paris, 1874. 7½d.

Sicile. Girgenti. Port Empédocle, par E. Morien. Paris, 1874. 7½d.

‖ Mer Mediterranée.—Carte des passages entre la Gréce et l'île de Candie, par Germain. Paris, 1874.

¶ Mediterranée. Ile de Chypres. Croquis du Mouillage de Famagouste, par F. Dufour. Paris, 1874. 5d.

Chypres. Croqui du mouillage de Limassol, par F. Dufour. Paris, 1874. 5d.

Chypres. Croqui du mouillage de Lanarca, par F. Dufour. Paris, 1874. 7½d.

** Ocean Atlantique.—Ile de Porto Santo, Baie de Porto Santo, par Delamare. Paris, 1874. 10d.

†† Ocean Atlantique Sud.—Ile de Fernand Noronha, par A. Martin. Paris, 1874. 10d.

‡‡ Ports de la Côte S. O. d'Afrique.—Baie du Hottentot, Baie Hondeklip, B. Rodewal, Port MacDougall, Baie Spencer, Port d'Ilheo, par Martin. Paris, 1874. 5d.

* Côtes ouest de Madagascar.—Iles Radami; baies de Raminitoc Rafala; Port Radama. Paris, 1874. 10d.

Baie Narenda et rivière Luza, par F. Dufour. Paris, 1874. 10d.

Port Mazambo, par F. Dufour. Paris, 1874. 5d.

Baie Majambo (Bombetuk), par F. Dufour. Paris, 1874. 10d.

Baie Boyenna, par Dufour. Paris, 1874. 7½d.

† Golfe de Siam.—Mouillages des 4 îles au sud des îles Balua, par Dufour. Paris, 1874. 7½d.

Mouillages d'Ham-Ninh et de Bai-Doe, par Delamare. Paris, 1874. 7½d.

L'Entrée du Cua-Giong, îles de Phuquoc, par Delamare. Paris, 1874. 5d.

Croqui des îles Pirates, par Delamare. Paris, 1874. 10d.

Mouillage et les îles Bai-Ba-Luong, par Delamare. Paris, 1874. 10d.

‡ Basse Cochin-chine.—Plan de la rode de Mitho, par Delamare. Paris, 1874. 7½d.

§ Japon, Mer Intérieure. Plan du port d'Utchi-no-Umi (île Shozu-Sima), par Dufour. Paris, 1874. 1s. 8d.

Golfe de Oosaka, entrée de Agi-kawa. Par Méa. Paris, 1874. 5d.

Golfe de Oosaka, entrée du Kitsu Gawa, Port de Sakai. Par Méa. Paris, 1874. 5d.

‖ Japon. Ile Yesso. — Mouillages d'Oterranai, and Port Endermo, par Méa. Paris, 1874. 7½d. each.

Japon. Ile Saghalien. Rade de Poro Tomari, par Delamare. Paris, 1874. 5d.

¶ Mer des Antilles.—Ile de la Culebra ou du Passage, par Delamare. Paris, 1874. 1s. 8d.

Ile de Sainte Lucie, par E. Morien. Paris, 1874. 1s. 8d.

Ile de Sainte Lucie; Baie du Gros îlet, par Dufour. Paris, 1874. 5d.

Partie et de l'île Tabago, par Delamare. Paris, 1874. 10d.

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Log Book.

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Lieutenant Cameron's Expedition.—News has been received from Lieutenant Cameron up to the 28th of February, 1874, when he was at Ujiji. He was in good health, and describes the country he passed through as very beautiful. He had obtained a large canoe with a sail and 14 oars, and was about to explore the lake thoroughly, before commencing a journey into the Manyuema country. The market at Ujiji is excellent, fish, eggs, yams, sweet potatoes, sweet limes, and pomegranates being abundant.

Lieutenant Cameron has obtained a good set of lunar observations at Ujiji, and finds the longitude to be 30° 4′ 30″ E., which agrees well with his dead reckoning, the latter being 29° 59′ 30″ E. His latitude of Ujiji by observation is 4° 58′ 3″ S., and by dead reckoning 4° 55′ 30″ S. The point of departure for the dead reckoning is Unyanyembe, a distance of 180 miles. He makes the height of lake Tanganyika above the sea by four aneroids 2740 feet, and by seven boiling point thermometers 2540 feet; Speke made it 1844 feet, and Livingstone 2884 feet. Speke's longitude of Ujiji was 30° E., and latitude 4° 54′ 56″ S.

Lieutenant Cameron found at Ujiji Dr. Livingstone's journal and map from Mikindany, and his sextant-stand. He was about to forward the documents to the coast, by a special mail. He has also sent home water of lake Tanganyika for analysis. The journey of this intrepid young traveller has thus been most important, both as regards the value of his own observations and the safety of Dr. Livingstone's papers. We confidently trust that he will be supplied with sufficient funds, and that the Cameron Expedition Fund will continue to find support among all lovers of geography and admirers of single-handed enterprise. Subscriptions are received by Messrs. Ransom, Bouverie & Co., 1, Pall Mall East. The list of subscribers is headed by the Duke of Edinburgh, and the subscriptions already amount to 600*l.*; but more is urgently needed.

The Arctic Campaign of 1874.—It is a bitter disappointment to all true geographers, to all well-wishers of the navy, and to those who have any regard for the ancient fame of Englishmen as explorers, that the change of Government and other untoward circumstances, should have caused the postponement of the despatch of an Arctic Expedition for another year. The feeling in the navy is, however, stronger than ever, and several of the most distinguished among the young officers are volunteers. Meanwhile, Captain Wiggins has sailed from Dundee, in the steamer 'Diana,' with the object of passing between Novaya Zemlya and the main, to the Sea of Kara, and reaching the mouths of the Siberian rivers. Captain Wiggins, who is an experienced seaman, was an examiner for the Board of Trade, at the Port of Sunderland. We hear that Mr. Leigh Smith, with characteristic generosity, has put a good stock of preserved provisions on board the 'Diana,' in case of falling in with the Austrian Expedition. Mr. Rickaby, who was in Baffin's Bay last year, on board the 'Erik,' has taken the 'Samson' to Spitzbergen, for sporting purposes.

Geographical Results of the Kashgar Mission.—Accounts of the excursion to the Pamir Table-land, by members of Mr. Forsyth's Mission to Kashgar, will be found in other parts of the present number (See pp. 139 and 173). The results of this excursion may be summed up as follows:—There are two Karakul lakes on the plateau, the drainage from one flowing east, and from the other west. The eastward stream is the Ghiz, which, passing through the Ghiz-Dawan, becomes the Kashgar River. That flowing west joins the stream from the Ghiz Lake or Pamir Kul, and forms the Murghab River. It enters Shignan at Bartang, and falls into the Oxus five days' journey below Kila Punja, at a place called Vamer. Shignan (Shaghnan) has been ascertained to be perfectly independent, and is ruled over by Yusuf 'Aly Shah, who also owns Roshan, and the adjoining Pamir. The territory of Wakhan extends up to the junction of the Aktash stream with the stream flowing from Lake Karakul, and contains the great, little, and Alichur Pamirs. The true water-parting between the east and west is the Kizilyart plain, belonging to the Amîr of Kashgar. The Shignan Pamir and the Kizil-yart Plain are inhabited by wandering Kirghiz. The other Pamirs have been abandoned of late years. From Tashkurgan to the small Karakul Lake is one day's march, from the small to the great Karakul five days, and from the great Karakul to Ush is six days' march. The Barojit Pass into Chitral is reported to be extremely easy, and open during the whole year, except about six weeks in March and April.

The map facing page 374 of the number of *Ocean Highways*, for March 1873, will be useful in reading these reports; and the article on Central Asia, at page 373 of the same number, gives some further account of the Pamir, and of the chiefships of Shignan, Roshan, and Wakhan.

The Treaty with the Amîr of Kashgar.—Mr. Forsyth signed the Treaty of Commerce between the British Government and the Amîr Muhammad Yakub Khan, Ruler of Kashgar and Yarkand, on the 2nd of February, 1874.

By the 1st Article the subjects of each state are at liberty to enter, reside in, trade with, and pass with their merchandize through all parts of the dominions of the other; and shall enjoy all the privileges and advantages which are accorded to the subjects in such dominions, or to those of the most favoured nation. By the 2nd, the merchants, of whatever nationality, are at liberty to pass from the territories of one contracting party to those of the other, at all times and by any route they please; but, by the 3rd, European British subjects, entering the dominions of the Amîr, must be provided with passports certifying their nationality. The British Government, by the 4th Article, engages to levy no duties on goods imported by any route over the Himalayan Passes; while the Amîr engages to levy no import duty exceeding 2½ per cent. *ad valorem*. By Article 6th, it is arranged that the British Government and the Amir shall be at liberty to appoint representatives, and commercial agents subordinate to them, within

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their respective territories; such representatives having the rank and privileges accorded to ambassadors by the law of nations; and the agents being entitled to the privileges of consuls of the most favoured nation. The 8th Article provides for the way in which civil and criminal cases, in which British subjects are concerned, shall be decided within the territories of the Amîr, and the other articles refer to the filing of legal documents, disposal of the effects of deceased persons, and to debtors. The treaty consists of 12 articles. It was ratified and confirmed by the Governor-General on April 13th, 1874.

The Russians on the Persian Frontier.—The two telegrams from the Berlin correspondent of the *Times*, regarding the proceedings of the Russians in the Turkman country north of the Atrak do not appear to have attracted the attention they deserve. Disappointed in their attempt to obtain Persian co-operation in their project for occupying Marv, the Russians seem to be striving to enlist in their service their quondam enemies, the Yomut and Akhal-Tekeh Turkmans. The Yomuts, even those on the Persian side of the Atrak, are alleged to have asked for incorporation with Russia; and the Akhal-Tekeh, whose territory lies on the direct route from Krasnovodsk to Marv (see map in *Ocean Highways* for April, 1873), to have asked for protection, not only against the attacks of their brethren the Marv Tekeh, but also against the Persian Kurds. It may be remembered that these Kurds were placed in colonies on the frontier by Shah Abbas the Great nearly three centuries ago, to protect it from these very kidnappers and robbers. If there is no fable of the wolves asking the bear for protection against the sheep dogs, here, at all events, is the moral. It should be understood that published maps of this region are very inaccurate, especially as regards the river Atrak. The result of Colonel Baker's journey is to show that the Atrak does not receive tributaries from both sides, but from the north only. Hence, if a frontier line is allowed to be drawn along the course of the Atrak, not only many Persian villages, but the important Persian town of Shirwan will be annexed to Russia. Indeed, so far as a Russian Ukase can do it, this is a *fait accompli*.

Disordered State of Southern Persia.—The disorders which accompanied, and were supposed to have been caused by the famine in Persia, have not disappeared with returning prosperity. We hear that Sultan Murad Mirza has been re-appointed Governor-General of Fars: the Shah having been obliged to supersede his own son in order to obtain the services of this statesman—the ablest and most experienced of the Kajar princes. The disorganized state of the country renders the roads so unsafe, especially between Bushire and Shiraz, that commerce is almost at an end. Things are in such a state that the baggage of Captain Napier, second son of the Commander-in-Chief in India, was plundered near Kazerun, only two months ago, though accompanied by a powerful escort. Murad Mirza is the one man in Persia who is able to cope with the turbulent wandering tribes of Fars and Khurasan. But since the original accession to power, in 1872, of Mirza Husain Khan, the Prime Minister who accompanied the Shah to England, he has been kept in the background. Now, however, finding himself unable any longer to dispense with the services of his able uncle, the Shah has promoted him from the insignificant Government of Isfahan, to that of Fars, one of the three most important in the kingdom. The Persian news, in the *Pall Mall Gazette*, of June 19th, informs us of the return to power of "Mirza Khan" (meaning Mirza Husain Khan) which took place many months ago, only with the inferior title of Minister of Foreign Affairs: he is no longer Sadr Azam. The further statement of the *Pall Mall* that "the Sultan Mourad, the grand uncle of the Shah," has suffered banishment, is quite erroneous; it should be that Sultan Murad Mirza, the uncle (not the grand-uncle) of the Shah, has been promoted, as stated above, to one of the highest appointments in the gift of his nephew. We are surprised to find these mistakes in a journal which is, as a rule, exceptionally accurate as regards its eastern news.

The Peruvian Survey of the Upper Amazons. — Last May, the Peruvian Admiral Tucker, so long the chief of the Hydrographic Commission on the Amazon (see *Ocean Highways* for October, 1873, p. 268-70, and the *Geographical Magazine* for May, p. 82), proceeded to New York with a commission from the Peruvian Government to publish the results of his surveys. A work of real geographical importance may be expected from the labours of Admiral Tucker and the officers who served under him, while exploring the principal Peruvian tributaries of the Amazons.

The Boundary between Peru and Brazil.—Commissioners of both nations have been at work, on the River Yavari, with the object of settling the boundary between the Brazilian Empire and Peru, southward from the Amazon. They have completed their labours; but we regret to hear that the Commissioners, Captain William Black and the Barão de Teffé, have suffered severely from illness, while the Brazilian assistants, Karl von Hoonholtz and Joao Ribeiro da Silva died, and were buried on the banks of the Yavari. The Commissioners returned to Tabatinga on the 1st of last April, after having overcome extraordinary obstacles in ascending the river, in spite of which we understand that they explored and surveyed its course.

Exploration of Bolivia.—The Government of Bolivia is about to send an expedition, to start ultimately from Sauces, and to discover a route direct to the river Paraguay, in the neighbourhood of Otiquis. A retired American naval officer, Commodore Cilley, had explored the unknown Otiquis, accompanied only by five sailors. He found a good port and dry land, starting thence to Santa Cruz de la Sierra, which place he reached last April, having performed most of the journey on foot. He proposed to build a railroad from the port on the Otiquis to Santa Cruz, to be ultimately continued to Chuquisaca. His scheme, which includes a 7 per cent. guarantee from the Bolivian Government, is under consideration. Commodore Cilley is well provided with instruments, and is a good surveyor. Another project is to construct a railroad between La Pay and the worm valleys to the eastward, called the Yungus, which yield the famous chocolate, coca, and cascarilla.

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Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

June 1st, 1874.

AT a meeting of the Royal Geographical Society on the above date, Sir Bartle Frere in the chair, Dr. W. B. Carpenter read a paper on "Further Inquiries on Oceanic Circulation."

June 15th, 1874.

A MONTH'S JOURNEY IN KHOKAND.

SIR HENRY RAWLINSON took the chair at 8.30 P.M. In opening the proceedings, Sir HENRY said he had been requested to preside in consequence of Sir Bartle Frere having been obliged to go to Cambridge in order to receive an honorary degree. It was only due to the Society that he should notify the arrangements which had been sanctioned by Her Majesty's Government with regard to the late Dr. Livingstone's family. Sir Bartle Frere had already informed them that in addition to the pension of 200*l.* a year which had been bestowed on the family, an application had been made to Her Majesty's Government to fix some further capital sum for the family, the amount recommended by the deputation which had waited on the First Lord of the Treasury being 10,000*l.* or 11,000*l.* The Government, however, after due consideration, had thought that all claims would be liberally met by awarding the sum of 3000*l.* to the family, and that amount would in due course be presented to Parliament to vote. Besides that, the Government had also undertaken to pay all the arrears due to Livingstone's followers. On their arrival at the coast it had been found that a sum of nearly 1000*l.* was due for arrears of wages, and the acting Consul-General at Zanzibar drew for the amount on the Royal Geographical Society. The Society, however, had felt that though they took the greatest interest in Dr. Livingstone's proceedings, they were not responsible for the expenses of his servants, and represented that to the Government, who had, in a proper and liberal spirit, consented to take the whole expense on themselves. It would, therefore, be understood that all pecuniary matters between the Livingstone family and the Royal Geographical Society were concluded, he believed to the satisfaction of all parties. Sir Henry then introduced Mr. Schuyler to the meeting as a gentleman who had recently returned from a very interesting journey in Central Asia, being the only European who had ever travelled in the interior of Khokand.

Mr. SCHUYLER, the Secretary of the American Legation at St. Petersburg, then gave an account of some months' journeying in Khokand last year. He said he had been in Central Asia for eight months in 1873, having left St. Petersburg in March, and returned there in November. His head-quarters had been chiefly at Tashkend and Samarcand; but during the time he had had the opportunity of spending a month in Bokhara, passing through the little-known province of Shahrisabe, and also of spending a month in the Khanate of Khokand, returning home by Lake Issyk-kul and the province of Kulja. He had left the Russian town of Khojent on the 19th June, in company with a Russian Engineer officer, who was visiting the knanate for the purpose of buying timber to construct a bridge over the Syr Darya. Travelling, of course, on horseback, as the only means of locomotion, he had visited the capital city, Khokand, going from thence in a north-east direction to Balyktchi and Utch-Kurgan, on the river Naryn. Hence he had travelled to the south-east to Andijan, one of the largest cities of the country, and to Ush, in the extreme east of the khanate. He had been prevented from going on to Kashgar, or from making any excursions in the mountains in the direction of Karategin, in consequence of a rebellion which had broken out amongst the Kirghiz. In spite of a written promise he had from the khan, the authorities refused to allow him to proceed unless he would give them a paper taking all responsibility from them in the event of his death. When finally allowed to go to the mountains, he had been deceived by his guide, who, by the direction of the authorities, misled him on the road back to Khokand, to which he had therefore to return. He had had, however, an opportunity of seeing the life of the people, and of making himself acquainted, to some extent, with the commerce and industry of the country. At Khokand he had been kept under a species of surveillance, not being allowed to leave, after 7 P.M., the serai where he was living with the Russian merchants. He had been taken to Utch-Kurgan for the purpose of being presented to the khan; but he had only been allowed to see him at a distance of 500 feet. The khan and his subjects, never well disposed to the Russians, seemed at that time to be more suspicious of them than ever, and travelling with Russians, and with Russian introductions, they could not realise that Mr. Schuyler was other than a Russian. Khokand was an almond-shaped valley, 160 miles in length by 65 miles in extreme width, surrounded on all sides by mountain ranges or plateaus, narrowing to small hills near Uzgent, which is the only road into the khanate practicable for wheeled vehicles. The most fertile part of the country was in the neighbourhood of Andijan and the territory lying between the rivers Syr Darya and Naryn. After the junction of those two rivers their united stream run between high banks, and became useless for the purposes of irrigation, and the rest of the country only became cultivable so far as the mountain streams running down into the plain were available for that purpose. About the city of Khokand itself there was a sandy desert 10 or 12 miles wide, extending in nearly every direction. Although Khokand was spoken of as being one large valley, it was really a series of small oblong valleys, separated by low, narrow ridges, often of trap, which seemed to run from east to west. The climate was more equable than in the district of Russian Turkistan, being warmer in winter when little snow fell, whilst in summer, though the day was hardly bearable, the nights were cool and comfortable. The mountains abounded in minerals, and in many places coal and iron had been found, as well as naphtha and petroleum. The commerce with Russia amounted, in 1872, to about 500,000*l.* in value, the chief exports being cotton and silk. The yearly exports of cotton in the raw state were about 8,000,000 lbs., and of silk 200,000 lbs. The population of the khanate was probably under one million, and sharply divided into two classes, the settled inhabitants and nomads. The settled population was chiefly composed of Usbegs, speaking Turki; but in the Western district there was a considerable number of Tadjiks, a people of Persian origin; and there were, as in all parts of Central Asia, a number of Hebrews, Hindoos, and occasionally Affghans. All the civil troubles of Khokand were caused by the hostility existing between the settled population and the nomads, who were composed of Kara-Kirghiz and Kipchaks, numbering in all not more than 300,000. The Kipchaks lived to the north of the river Naryn; while the Kara-Kirghiz lived chiefly in the mountains of the south, cultivating the land along the foot hills, and pasturing their flocks in the mountain valleys.

THE KASHGAR MISSION.

SIR HENRY RAWLINSON said he proposed to bring before the Meeting some of the geographical results of Mr. Forsyth's Mission to the Amir of Kashgar. So much has been written of late years on the subject of the country which used to be called Western China, but which is now better known as Eastern Turkistan, that I

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may presume you to be acquainted with its general features and history. You know, for instance, that it occupies the great interior basin of Central Asia, intermediate between Russia and British India, being bounded on the north by the Tian-Shan, or Celestial Mountains, and on the south by the Kuen-Lun, or mountains of Little Tibet. The skirts of this basin being one alluvial deposit, and being watered by streams from the circumjacent mountains, are well cultivated and densely peopled; but the interior is a desert throughout, composed, for the most part, of a sandy waste, with forests of jungle along the river-beds. The people are a fine, frank, hardy race; Muhammadans, but not bigoted, very friendly indeed to Europeans, and superior, according to the experience of our officers, to all other Asiatics with whom they had been in contact. Indeed, the pictures given by Mr. Forsyth and his officers of the hospitable and unassuming manners of the people of Yarkand and Kashgar, their industry, intelligence, probity, and activity both of mind and body, impress one most favourably after the accounts one generally has of the sloth, and dirt, and misery, and depravity of the East. This country maintained its independence from the time of Timour to the latter half of the last century, when it was overrun by the Chinese, in whose hands it remained until eleven or twelve years ago, when the people rose in rebellion and drove out their Chinese oppressors, placing themselves under the rule of a certain Yakub Beg, a Kokandi of Andijan, a soldier of fortune, who, having fled before the Russians, came upon the scene at this fortunate moment. Yakub Beg, or the Amîr, as he is now called in virtue of a firman from the Sultan, has proved himself a very wise and able leader. He has repressed brigandage, encouraged trade, raised a very decent military force, and generally strengthened and improved his country; his only fault, indeed, seems to have been a certain lust of territory, which has prompted him to extend his conquests too far to the eastward. Not content, indeed, with Aksu and Turfan, he has pushed on to Goroomelie and Manas, across one of the spurs of the Tian, thus coming into contact with his old enemies the Chinese, who still hold Barkul and Haniel, and placing himself in a somewhat difficult relation with the Russians at Kulja.

Our first communications with this chief were opened by Shaw and Hayward in 1868. Since then Mr. Forsyth, of the Bengal Civil Service, was deputed by Lord Mayo to Kashgar, but got no farther than Yarkand, owing to the chief being engaged in fighting the Tungans at Goroomelie. During the last winter, Lord Northbrook has resumed the idea of opening out commercial relations with Turkistan, and has sent to Kashgar, under the direction of Mr. Forsyth, one of the best-appointed missions that has left India since the days of Malcolm and Mountstuart Elphinstone. Lord Northbrook, indeed, greatly to his credit, seems to have recognised that, in visiting our almost unknown country, there are other things to be thought of besides political relations; that it is, indeed, of almost equal interest and importance to investigate the geography and geology, and natural history of the country, to examine into its trade, and products, and manufactures, to collect information regarding its ethnology, and the religion, and character, and manners and customs of the inhabitants. All these objects seem to have been duly cared for in the composition of the mission, of whose reports, relating mainly to geography, I propose to read extracts to you this evening.

Sir HENRY RAWLINSON then read a series of extracts from letters written by officers engaged in the Forsyth mission to Kashgar, which he said would redound greatly to the credit, not only of Forsyth himself, but to the British nation, of which he was a citizen. The extracts were from letters by Col. Gordon, Capt. Trotter, and Capt. Biddulph, and referred exclusively to the geographical discoveries made in the course of the journeys.*

* See pp. 139-144.

Mr. SCHUYLER having given some interesting details of Central Asian etymology calculated to throw some light on the geographical nomenclature of the district, a vote of thanks was passed to him, and the proceedings terminated with the announcement that the annual meeting would take place on the following Monday, at 1 P.M., and the dinner the same evening.

Meeting of June 22nd, 1874.

THE PRESIDENT'S ADDRESS.

THE anniversary meeting of this Society was held, under the presidency of the Right Hon. Sir H. Bartle Frere, K.C.B., at 1 P.M., in the hall of the University of London, and was attended by Major-General Sir Henry Rawlinson, K.C.B.; Lord Cottesloe; Count Münster, German Ambassador; Malcom Khan, Persian Minister, &c., &c.

The Royal (Founder's) Medal, for the encouragement of geographical science and discovery, was awarded, through Count Münster, to Dr. Schweinfurth, for his explorations in Central Africa, his discovery of the Uelle river, beyond the south-western limits of the Nile basin, and for his admirable work, "The Heart of Africa," in which he has recorded the results of his travels; and the Victoria or Patron's Medal was presented, through Mr. Bateman, to Colonel P. Egerton Warburton (now in Australia), for his journey across the previously unknown western interior of Australia, from Alice Springs, on the line of overland telegraph, to the west coast, near De Gray River.

Public school medals were presented as follows: Physical Geography—Gold, L. Weston, City of London School; bronze, F. C. Montague, University College School. Political Geography—Gold, W. H. Turton, Clifton College, Bristol; bronze, L. Jacob, City of London School.

Sir BARTLE FRERE then delivered the annual address on the progress of geography. After congratulating the members on the continued prosperity and activity of the Society—no fewer than 342 new members, besides 9 honorary corresponding associates, having been elected during the year, making 2809 ordinary and 76 corresponding members on the rolls of the Society—the right hon. gentleman proceeded to mention the losses by death during the year. The one, he observed, that had produced the most unfeigned sorrow in every quarter of the globe was that of the great explorer, David Livingstone—so many reflections were suggested by his late exertions, his sufferings, his death in a land which he himself was first to explore. The circumstances connected with the return of his faithful followers, and the ultimate interment of his remains in England, made it difficult to review the events of a life thus recently closed with the ordinary ken of the friend or the chronicler. And yet, was there not a true consolation for all who mourned his loss, as they calmly endeavoured to think upon those motives and ends which, in his hands, lent a constant lustre to geography, and rendered the great traveller's membership amongst the Fellows of the Society a matter of continual satisfaction? Could they conceal from themselves the fact that the Society to which he had so often contributed priceless stores of actual observation had felt an increase of vigour and prosperity from its close association with his career? That mark by which the advancement in science would be constantly detected in future ages they perceived at a glance to be already stamped indelibly on modern geography, and no hand had helped to imprint it so clearly and sharply as Livingstone's. History must decide whether his greatest glory was gathered as the explorer or as the determined opposer of slavery. If Africa was large enough for his wanderings, the slave trade was dreadful enough for all his pity. A lesser energy would have been swallowed up in the vastness of either, and a weaker heart would have stood still at the cruelties which he exposed and frustrated. Sir Bartle then gave

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a minute history of Livingstone's career, starting from his birth-place at Blantyre, near Glasgow, in 1813, to his death on the shores of Lake Bangweolo, in May, 1873, and to his interment in Westminster Abbey in April last.

Sir Bartle expressed regret that the Society had been unable to dispatch an exploring expedition to Smith Sound, and referred to the unsuccessful issue of the steps taken to secure the aid of the late Government for that purpose. He said that the change of Government had delayed any further steps being taken; but the Council hoped to bring the subject before the present Ministers. In conclusion the President referred to the hydrographical surveys undertaken by the Admiralty during the past year, to the deep-sea exploratory voyage of the 'Challenger,' to the Indian Marine Surveys, to the geographical progress in Central Asia, America, New Guinea, Italy, Palestine, Persia, and elsewhere.

Chief Justice Daly, President of the American Geographical Society, and Mr. T. M. H. Livingstone, son of the great explorer, were elected Fellows of the Society.

In the evening the Fellows and their friends dined together at Willis's Rooms.

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BERLIN GEOGRAPHICAL SOCIETY.

WE have received the printed "Proceedings" of this Society, bearing date 11th of April, which contain a few letters, dated the end of March, from Drs. Rohlfs, Ascherson, and Schweinfurth, on the final operations of the Libyan Desert Expedition. Rohlfs, Zittel, and Jordan had arrived at Dachel, from their excursion, about the middle of the month, and were preparing to go on to Siwah, and thence to strike the Nile about Esnek. There is remarkably little of interest in any of the letters; Zittel's geological discoveries appear to be the most important fruits of the expedition, while Schweinfurth, at Chargeh, had been able to collect some new kinds of birds of passage and a very few botanical specimens.

GERMAN AFRICAN EXPEDITION.

Dr. BASTIAN furnished the meeting with an exposition of the doings of the African Society, more particularly with reference to Dr. Güssfeldt's recent journey up the Quillu. Close to Kama-Chitomoo the river for the first time becomes rocky; by Maniamatal, the banks increase considerably in height, and the last trading station is reached in the neighbourhood of the Bumina cataracts. After crossing the parallel mountain ranges through which the Quillu here breaks, Dr. Güssfeldt came amongst the forest villages of the Bayumbe, which border on the Balumbo, and on the 7th of November he made ready for his trip into the Yangela country. In N'Congo he had to pass the boundary or frontier which is here marked by a big gate somewhat similar to the two gates in the wooden wall on the frontier of the Loango country, between Quillu and Luema. As the doctor continued his journey, the character of the country changed; the heavy forests became thinner, and the landscape assumed a park-like appearance; picturesque views presented themselves occasionally, and bare, dome-shaped mountains filled up the background. At Nunsi (about 2100 feet above the sea) a good view of the Yangela country was gained, and the eye ranged over it as far as the Ba-Tetye land, which consists of grassy plains traversed by mountain ranges running from E.N.E., and rising in height to the southward. At the village of Chikengene in Yangala, Güssfeldt described the scenery as reminding him exactly of Switzerland. By the village of Tondo the skull of a gorilla was discovered, proving that its *habitat* had been reached; and shortly after, the Upper Quillu, after making a great bend, was touched at a point where it is from 350 to 400 paces broad. After crossing over to Mayombe, Güssfeldt returned to Chimbek Mankossu, and eventually to Chinchoxo, which he reached on the 2nd of December, and where the other members of the expedition had assembled to make preparations for the great interior journey. This will probably be directed through the Shin Tetye country to the Mombuttu land of Schweinfurth, crossing the equator in the heart of Africa. An extraordinary drought prevailed on the coast, no rain having fallen; the expedition expect, however, to benefit by this circumstance, as the rivers will thus offer less obstruction. The health of the entire party was pretty good, and Dr. Falkenstein had been exercising his curative art on several Europeans along the coast.

Dr. Leng will be attached to the expedition in the capacity of geologist, and he will repair to the Ogowai River, where Herr Woermann, a Hamburg shipowner and merchant, has promised to render him assistance. He will make for the furthest point which has been reached by traders, and explore the geology of the neighbourhood. It has been ascertained from travellers that the tribes a little way in the interior have extensive dealings and frequent communication with those further south, their languages also having a very close affinity. Dr. Leng will accordingly follow the course of the Ogowai above the falls, and thence ascend the Okanda, which all accounts tell us leads through an open country of a strikingly different character. He will then endeavour to effect a junction with Dr. Güssfeldt's party. Should, however, it appear probable that he might successfully penetrate into the heart of the country, by a north-easterly route, the Society will then take measures to supply him with the necessary equipment.

In order to carry out the project of exploring Inner Africa, it will be necessary to occupy Kassandye, as an intermediate station, and thence to work toward the Muata Yambo kingdom. Should financial considerations admit of additional supplies being despatched to that point, it will doubtless, contribute to the success of the expedition.

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FRENCH GEOGRAPHICAL SOCIETY.

Meeting of May 22nd, 1874.

M. CHARLES MAUNOIR informed the meeting that the Geographical Society at Lyons intended next year offering a prize medal, value 500 francs, for the best memoir on the geographical distribution of silk. Two other medals would be offered for competition, one of which would be for an essay on the best means for the diffusion of geographical science.

Mr. WALKER states, in a letter from Elobé, near Corisco (Gabûn), that he left the French travellers, MM. Compeigne and Marche, on the Okanda River, and encloses a letter from M. Compiègne, dated February 12th. They had reached as far as Ossé, in the country of the Okanda, and had succeeded in making arrangements with the King for their further journey to the Otjebo tribe. M. BOUVIER stated that he had received the journal of these travellers from the 25th of December last to the 12th of February.

Intelligence has been received from MM. FAU and MOREAU, now on a mission to Birmania. They give a description of the mineral wealth of the country, and mention more particularly its wells of petroleum and mines of rubies.

The Abbé DURAND read a letter from Father Duparquet from Loango. In describing the banks of the river Kiloango (Chiloango), which is used as a water-way for carrying palm-oil to the factories on the coast, the missionary states that several European factories have lately been established there, the greater number of them belonging to Dutch merchants—one, however, called Shiuma, which is situated at the upper part of the river, belongs to the French. Father Duparquet adds an account of the kingdom of Kakongo and its capital Kinghile.

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The Rabbi MARDOKHAI BEN ABI SEROUR was present at the meeting, but being unable to speak French, M. Duveyrier, after pointing out on a map the extensive and interesting journeys this Jewish gentleman had made, stated that he was born at Aqqa, a town in the basin of the Dhra'a River, Sahara. His first journey brought him to Sûs, where he recollects having seen, in the district of Tazerwâlt, the ruins of an ancient city, some of the stones bearing inscriptions which perhaps might be either Phœnician or Latin. He then went to Merrâkesh, Rebât, Tanja (Tangier), and Gibraltar. There he embarked for Malta, Tunis and Alexandria. After a trip to Cairo, he passed by sea to the Holy Land. In Asia, he stopped at Beyrût, Jaffa, Jerusalem, Latakië, Antakië, Haleb, and on the shores of the Lake of Tiberias. From thence he returned to Tunis, and visited Sûsa and all the principal towns of Syrtis Minor, Sefâqes Gâbes, the Island of Jerba, and Tripoli. In Algeria he travelled from Algiers southwards to Laghuât, the country of the Benî-Mezâb, Melthîli, and continuing his way to the east he passed by Sîdi 'Oqba, the oasis of Sûf, and entered the Tunisian Sahara at Nafta. Passing by Tôzer and Gafça in the Jerîd, he arrived at the northern portion of Tunisia at Qairuân, a holy city of the Muslims, and then returned to Sûf, where he was detained for six months by illness, His further travels led him to Tamentît, in Tuât, and also to the great markets of In-Çâlah and Timmimûa, the former situated in the southern, the latter in the northern part of that cluster of oases. From Tuât he returned to Aqqa. Looking then for a new field of travel, Mardokhaï journeyed to Timbuktu by the road of Tendûf. He passed fourteen years in Timbuktu, where no Jews had previously been admitted. On his arrival the inhabitants treated him very cruelly; but soon afterwards, as Timbuktu recognized the government of El-Hâjj 'Omar, the persecution ended, and Mardokhaï was allowed to resume his journey along the river Niger to Sansandi southwards, and to Eghedesh and Gôgô eastwards. His furthermost point east from Timbuktu is Ahara.

Meeting of June the 3rd, 1874.

THE Paris Geographical Society held its first meeting in the hall of the Societé d'Encouragement on June the 3rd; such a change had become necessary on account of the insufficiency of the rooms at Rue Christine No. 3, to admit the increasing numbers of Fellows who attend the meetings.

Admiral DE LA RONCIERE LE NOURY, President of the Society, reported further progress with regard to the Congress. Referring to the communication made at the last meeting by the President of the Council, M. Delesse, as to the contributions of the public offices to the Congress, he said that the Ministers past and present, had all of them shown the greatest readiness. The only exception was the Minister of Public Works. The City of Paris had not yet given an answer. The Admiral had sent to the various foreign Governments on the subject of the formation of a Committee of Honour. The German Ambassador had replied, stating that the Geographical Society at Berlin would be represented at the Congress, and that that body had already appointed its commissioners. Lord Lyons, Ambassador of England, had also answered, and communicated the names of the English Commissioners, as well as a list of gentlemen proposed for the Committee of Honour. The answer of Austro-Hungary came through the hands of Count Apponyi.

The President of the Council, M. DELESSE spoke on the present state of the Society, which now numbers 1003 members. The fund for travels has been augmented, and is now represented by a sum of 10,000 francs, out of which 1500 francs will be sent to M. Dournaux Dupéré.

The Secretary, M. MAUNOIR read the correspondence, including several letters communicated by M. Meurand, Director of the Consulates. One from the French Consul at Baghdâd contains information on the provinces of El-Haça and Qatîf in Eastern Arabia; a second, from M. Gasselin, contains information on the Sahara; and a third, from M. Delaporte, mentions some particulars respecting M. Dournaux Dupéré, the French traveller in the central Sahara. M. Dournaux Dupéré had written to M. Delaporte in Tripoli, stating that he was about to leave Ghadâmès, in company with M. Joubert, on the way to Rhât, and asking for a letter of recommendation to Ikhenoûkhen. Two letters from M. Dournaux Dupére were also read. M. Tissot, French Minister in Morocco, reports that the question of the historical identification of the ruins at Moulaï Edrîs is definitively settled by the discovery of inscriptions. MM. Fau and Moreau writing from Barma, state that the king of that country intends consulting them on the subject of the roads of intercourse to be constructed there. They were on the point of starting on a journey in the south-east of the kingdom.

M. DAUBREE announced the return from China of the Abbé Armand David. That missionary and naturalist had been prevented from attending the meeting by a serious indispositon.

Dr. HAMY referred to the two little Akka negroes, and exhibited their photographs. He said that Professor Richard Owen had examined them in Cairo. Their stature is small for their age, yet they are by no means feeble. The eldest of the two is 1.11 metres high; the youngest between nine and ten years of age is only 1 metre high. They are pretty well proportioned, but their legs show no traces of calves, and their flat feet are remarkable by a prominent heel. The Akka have nothing in common with the characteristics of the Soaqua or Bushmen. Their age prevents the formation of any precise conclusion as to the adult proportions of the Akka race. Yet M. Schweinfurth is wrong in comparing them to the Obongo and the Soaqua. Except in their diminutive height, the Akka resemble the Shilluks and the Denka.

M. L. DE PUYDT made a communication on the Isthmus of Darien, with reference to the practicability of an interoceanic thoroughfare. From 1861 to 1865 M. L. de Puydt travelled in the Cordillera with the object of finding a passage from the Atlantic to the Pacific Oceans. He explained what had been done for the geography of that part of South America previous to his researches, and described the results of his own work from the river Tuyra, on the Pacific watershed, to the Puerto Escondido del sud on the shores of the Atlantic.

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THE

GEOGRAPHICAL MAGAZINE.

AUGUST, 1874.

THE CAMERON EXPEDITION.

THE interest of African exploration now centres on the single-handed expedition of Lieutenant Cameron. We have in previous numbers* followed this gallant young naval officer along his difficult and tedious route from the coast to Unyanyembe, where he and his companions were brought to death's door by repeated attacks of fever. There is something very noble in the devotion of Cameron, who thus, without pay or any other selfish inducement, risked his professional career, his health, and his life to serve and succour the great explorer of whom he had heard much, but who was to him a perfect stranger. Livingstone's men very naturally supposed that it must be a son who had gone through so much to succour their old master; and, indeed, no son could have shown more devotion. Nothing daunted by repeated attacks of fever of unusual severity, he remained steady to his resolution to complete the service that had been entrusted to him, when the news reached him that Dr. Livingstone was no more, and that his servants were approaching with his body and effects. We have, in a previous number, expressed our hearty appreciation of the noble and loyal conducts of these men.† They had, with an affectionate zeal, which is deserving of the highest praise, carried the body and all the explorer's papers over the great distance from the place of his death, and it was most providential that an English expedition was at Unyanyembe to furnish supplies, and take charge of the precious freight in the equally hazardous journey to the coast. The caravan was within a few marches of Unyanyembe, the men nearly naked and starving, when one of them brought in the tidings, and Cameron sent him back with a bale of cloth, to buy provisions, so as to continue the journey. As soon as Livingstone's men reached Unyanyembe, they gave way to the temptations of the place, and a set of orderly fellows was, for several days, converted into a drunken and riotous mob. This was natural, but it shows how entirely the safe transmission of Livingstone's body and effects depended on the presence of Lieutenant Cameron's expedition. That officer at once assumed all responsibility; and, in a letter dated December 4th, he instructed Lieutenant Murphy to take charge of the Livingstone caravan to the coast. Lieutenant Cameron had given Livingstone's men ample supplies for the journey to Zanzibar, but it nearly all went in drinking at Unyanyembe, and, when he gave charge to Lieutenant Murphy, it was necessary to furnish more. It took several days to get the men together, but at last Lieutenant Murphy started, with Dr. Dillon; and, by a clever *ruse*, the former officer succeeded in carrying his precious freight through the Ugogo country. He was thus enabled to effect the march without opposition. When Livingstone's men were again on the march they behaved well, and were very tractable. The party left Unyanyembe on the 9th of November 1873, and on the 17th poor Dillon died. His companion pays a just tribute to his memory: "A skilful and zealous officer, and a highly accomplished scholar, a firm and steadfast friend, of unsullied honour, and one who ever protected the weak against the strong, in him the country lost one of her most valuable servants."

Cameron was now alone. Livingstone's men had reported to him that a journal and map belonging to the Doctor had been left at Ujiji, and that his desire was that they should be recovered. It now appears that this map is one of the utmost importance; being that of the unknown region between Kitanguli on the coast and Lake Nyassa. Without it the record of the great explorer's discoveries would be very incomplete; and its recovery is a most useful geographical service. It seemed to the young explorer that their recovery was a sacred duty, and he also considered himself bound to do his utmost, with the means at his disposal, to further the cause of geographical discovery. With these objects, but still suffering acutely from the effects of fever and ophthalmia, he broke up from Kwihara (Unyanyembe) on the 11th of November, and made a short march to a village called Mekwendwa. For many days he was retarded and harassed by the desertion of *pagazi*, or

* The previous history of the Cameron Expedition will be found in an article at p. 263 of the December (1872) number of *Ocean Highways*, announcing its despatch; and in Log Book Notes at p. 352 of the number for February 1873; p. 386 of that for March, p. 31 of that for April, p. 122 of that for June, and p. 211 of that for August 1873. These Notes report the progress of the Expedition. In the number for August 1873 (p. 199) there is an article giving an account of the march of the Expedition from the coast to Rehenneko; and in that for January 1874 (at p. 416), there is another article with a narrative of the march from Rehenneko to Mdaburn in Ugogo. In the number for March 1874 (p. 488) there is an article with an account of the sufferings and detention at Unyanyembe. In the number of the *Geographical Magazine* for April 1874 (p. 35) there is a Log Book Note on the results of Lieutenant Cameron's geographical work as far as Unyanyembe; and in the July number (p. 171) another announcing his arrival at Ujiji.

† See *Ocean Highways* for March 1874, p. 486.

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porters. Altogether forty days were wasted from this cause, besides the amount of wages. It was not until the 2nd of January 1874, that the journey regularly commenced.

The route taken by Cameron was at first south-west from Unyanyembe to the Ngombe River, and thence west to Uvenda. It was thus south of Burton's route; and a new line of country was traversed, by which light was thrown upon the drainage system of the southern part of the basin of the Malagarazi. Stanley had made a much wider *detour* to the south to avoid the hostile negro chief Mirambo; but the English officer did not allow any consideration of this kind to turn him from his course, which, therefore, lies between those of Burton and Stanley.

Mirambo was, however, as powerful and formidable as ever. The Arabs were doing nothing against him, there being a dispute as to who should take the command. It was rumoured that the negro insurgent intended to attack Cameron's party, in which case he would have had a warm reception. Signs of his inroads—deserted villages and abandoned cultivation—were visible on the route. Nearly all the province of Ugara is now tributary to him, and he is far more powerful than the Arabs represent him to be. He gets all the supplies he needs from the villagers, who are his allies in secret, whilst they openly profess friendship for the Arabs; and many disreputable Arabs are quite ready to furnish him with anything he requires. Lieutenant Cameron describes the fields no longer tilled, and the charred remains of the huts, and says—"it is indescribably saddening to pass through places which once were the homes of a happy and contented people, now all either dead or slaves, and to reflect that this devastation is all due to the unprincipled coast Arabs. The 'Omân Arabs are far superior to those of Zanzibar, and if they alone had penetrated to the interior the state of the country would be very different from what it is now." Cameron was told by one of Mirambo's followers that if his had been an Arab caravan, it would have been attacked, and would not have been allowed to pass; but that it was known that the English did no harm, and only came to see the country, and that they might, therefore, pass without hindrance. No large caravan had traversed the route for many years. It is to the south of Mirambo's territory, but Cameron believes, from what he heard and saw, that the insurgent chief would have let him march through his own country, if the request had been made.

After leaving Shikurah, the furthest southern point, whence the road turned west, the prospects of the expedition were bright and hopeful. The young traveller felt better in health and stronger than he had done for months. The weather was pleasant, and he was able to step out himself, and so keep all his men on the stretch. He describes the country, between Shikurah and the river Ngombe, as lovely though perfectly flat. There are open glades of bright green grass, interspersed with numerous clumps of trees, and *bosquets* of shrubs. The Ngombe stretched away in long reaches to the horizon, as wide as the Thames at Abingdon. Water lilies were abundant, and the views of the reaches, with green turf down to the water's edge, were enchanting. The clumps of fine trees were disposed as if planted by a landscape gardener, most of them growing on little eminences, but some on the water's edge, with their branches dipping in the stream. The Ngombe is a tributary of the Malagarazi.

Marching westward from this river over a dead level, they came, after four hours, to a small isolated hill, on the western side of which was the village of Kwatosi. During the day they were met by some men sent out by Sultan Taka, the chief of this Ugara country, to whom it was necessary to pay a *mhongo* or black mail of *22 doti*. Cameron did not go to the chief's village, as it was off the road; but he was accompanied by some of the chief's men to frank the caravan through, without paying more *mhongo*. The country looks as level as a billiard table, and is covered with one mass of jungle; the villages being built in the densest parts, rendered even thicker by being planted with milk bush. In spite of the apparent flatness, the land gradually rises from Shikurah, about 400 feet in 60 miles of the westward march. As the party advanced the country seemed very fertile, and once to have been well cultivated, but everywhere there were the signs of ruin caused by the Arabs. On the 15th of January, Cameron encamped near Liowa's village of Kwikura, where another *mhongo* was settled for 18 *doti*. The people cultivate sweet potatoes in large quantities, which seem to be their chief article of food. It became advisable to leave the main road, as it was blocked up by a colony of runaway slaves of the Arabs, who have muskets, and plunder all they can, occasionally joining with Mirambo for an attack on their former masters. These runaway slaves have been settled in this place for many years, and were there in the time of Burton and Speke. But they have been recently reinforced by several of the armed slaves whom the Arabs sent against Mirambo, and are of course more formidable than ever.

Here Cameron calculated, by dead reckoning, that he was 30 miles S.E. by S. ½ S. from Mpeti, on the Malagarazi, which agrees well with Burton's positions. On the 17th there were hills in sight to the westward, soon obscured by a tremendous fall of rain, the sound of which could be heard, like that of a great waterfall, before it reached the caravan. The country was rising gradually, and suddenly the party came to a steep dip, with outcrops of granite, almost precipitous in some parts, and several brawling torrents rushing over and among the rocks. They unite to form a stream called the Mtumbo, a tributary of the Sindé, which falls into the Malagarazi. The water was beautifully clear and bright, and in front, to the westward, there was a high range of hills. The Mtumbo has its rise in the southern part of Utendi, and, receiving many smaller streams on either side, unites with the Sindé close to its junction with the Malagarazi.

After the 19th the march was through a moist country, with tremendous rain storms. Unluckily, Cameron was nearly disabled by a severe centipede bite on the leg, and was obliged first to ride a donkey, and afterwards to be carried for some distance. The pain was intense, and prevented all rest at night.

On the 22nd the route led over a country covered with sheets and blocks of granite, or more probably gneiss, all the streams having their western banks rocky, and their eastern sides of earth. The country is well wooded and fertile, the drainage being to the Mtumbo. On the 23rd a river intercepted the route, which was 30 yards wide, and 7 to 10 feet deep.

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This brought the india-rubber boat into play, and everything was got across without accident in three hours. The route lay along spurs of hills to the south, until, in the evening, they reached a large plain. Cameron says, "I know not what we should have done without the boat to-day, or what we should have done at all without the two bell-tents, all of which we owe to Major Euan Smith's thoughtful kindness."

At this point provisions began to run short. The men were hungry, and went off in search of a village, while Cameron had had no meat for several days. The reason of this was that he had respited a goat which was bought for food. The little creature was so tame as to come and eat out of his hand, and he could not find it in his heart to have it killed. She was named *Dinah*, made great friends with the faithful dog *Leo*, and became so tame as to insist upon coming into the tent, and on to the bed. The dog and goat marched together, and swam side by side across the rivers and marshes in loving company. The people in the villages all wanted to know what medicine Cameron gave the goat to make her so fond of him.

On the 25th, after crossing another river in the boat, they encamped on its western bank close to the village of Ma'n Como, the chief of Kowende (Uvenda), 3573 feet above the sea. Further on the march was through mountainous country, with precipitous sides of granite rock. The hills are clothed with trees to their summits. The route led to the top of a ridge, whence there is a splendid view, stretching over rocky hills, expanses of emerald plain, and masses of sombre forest. Thence the path led over the tops of the hills, along a ridge, rising and falling, and often not more than 100 yards wide, with precipitous descents on either side. A tremendous downpour of rain in the afternoon covered the hill sides with running water, little torrents being formed at every 10 or 15 yards, which reminded Cameron of the streets of Catania, after a thunderstorm on Mount Etna. Half an hour after the storm was over the water had nearly all run off. If he had been able to walk Cameron would not have cared, but it was unpleasant to have to sit in a chair and be rained upon; and the pain from his leg was becoming more intense.

In this region of Uvenda the people are afraid to build their villages in the plains, as the Arabs seized them for slaves, and their neighbours, the Wavinza, do the same, for sale at Ujiji. Consequently all the level strip along the Malagarazi, as far east as Mpeti, is occupied by the Wavinza, who thus have the whole command of the ferries; while the Uvenda people are driven up into the hills. The villages are all small, the largest not containing more than seventy or eighty men; and every village head-man considers himself independent. The villages are built on the tops of precipices, or among rocks, as some defence against the slave-dealing Arabs and Wavinza. All this Uvenda country was populous a few years ago, but the infamous slave trade has depopulated it almost entirely. Cameron could obtain little food, and he was told that he was only given that because it was a white man's caravan. The people declared that they would sooner destroy their food than sell it to the Arabs. Descending from the ridge the party reached a well-cultivated valley, where the fields were fenced with strong fences of tree trunks in double rows, with the interstices filled in with brambles. The scenery is lovely. Many of the villages are built against the rocky sides of hills, and the people often live in regular caves.

On the 2nd of February they reached the river Sindé, and crossed it on a natural grass bridge. This kind of bridge turned out to be quite easy, and not at all dangerous, as Cameron had been led to expect. Part of the middle was so firm that it appeared to be solid ground, especially as earth had lodged on the top of the grass and ferns. The river is about 100 yards wide, and the growth, forming a natural bridge, continues for about half a mile. The hippopotami pass from one end to the other, underneath.

The hill country ends on the right bank of the Sindé, and on the other side is the plain inhabited by the Wavinza, which is well cultivated with *sim sim*, sweet potatoes, yams, and Indian corn. The people of the village of Itambali, the first halting-place beyond the Sindé, were very civil and obliging, and as soon as the tent was pitched some of the head-men brought the Uvinza chief, a child of eight years, to visit the English officer. Here it became necessary to settle the *mhongo* to be paid for passing through the Uvinza country. The hills come to an abrupt termination on the right banks of the Sindé, forming bluffs and capes rising out of the plain. Cameron had hitherto been unfortunate in obtaining sights, owing to the constant clouds and rain, but at Itambali he obtained two latitudes by altitudes of *Capella* and *Canopus*, the mean giving a result of 5° 15′ 56″ S.

On the 6th and 7th of February the march was continued to the banks of the Malagarazi. The people of Uvinza were very friendly, but bitter against the Arabs. Cameron laughed at and chaffed them when he found a large crowd staring, and they laughed also, and seemed to enjoy the fun. They like to see what is going on, but are not rude or obtrusive, and will go away at once if they are asked to do so. Cameron thought them a great deal better behaved than the people in an English village would be, if a black man came travelling about in the same way there. He had now reached Ugaga, and thus, for the first time, came on the route traversed by Burton and Speke in 1858. Cameron found the height above the sea, at Ugaga, to be 3048 feet.

All day of the 8th of February Cameron was detained, discussing the terms for being ferried across the Malagarazi River; and there was an alarm that Mirambo, who had been close to at noon, was going to attack them in the evening. The river was 30 yards wide at the ferry, running about four knots south-west. On the 10th the canoes arrived. They consisted of four long hollow logs of wood, about 18 feet by 2, which Cameron described as about the roughest arrangements he had ever seen in the way of boats; and two about 20 feet long, made of a single piece of bark, the ends being sewn up, and the gunwales stiffened with a batten laced on them, and kept apart by other sticks placed athwart the ends. They carried two or three men and their loads across at each trip, but that was as much as they could do, the water being within 3 or 4 inches of the gunwale. The crossing occupied five hours, from 8 A.M. to 1 P.M.; and it became necessary to halt at Mpeti, the first village on the right bank. Here Cameron obtained another latitude, by observations of the stars *Capella*

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and *Canopus*, 5° 7′ 37″ S., which only differs 15″ from that taken by Speke at the same place, in 1858.

As he continued his march, Cameron received news of Mirambo burning and destroying villages all round him; and many deserted huts and signs of abandoned cultivation were passed. On the 13th he reached Luguwa, the western limit of Uvinza, and entered the Ukaranga country. Here a sad event occurred, which the young explorer felt very much. Leo, the faithful dog which had marched with him all the way from the coast, was brought in, and just had time to look at his master and wag his tail, when he died. He was quite well in the morning, and must have been bitten by something, for his tongue and mouth had changed colour, and he was stiff within five minutes after his death. The villages in this neighbourhood are principally supported by the manufacture of salt. The black soil is full of it, which they wash and filter, and, after evaporating the water, very good white salt is obtained. The people come from a distance to get the salt earth, and conduct the manufacture in their own villages. Bombay, the veteran companion of Speke, had successfully brought donkeys with loads all the way from Unyanyembe, and at Luguwa a small foal was born.

On the 15th the river Rusugi was crossed. There was close jungle all the way down a valley, flanked by low, rocky hills; but this growth is quite recent, there having been villages and cultivation in the valley only a few years ago. They encamped 3 miles beyond the Rusugi, the little donkey being carried part of the way. Next day the Ruguva was passed, where they heard an elephant blowing in the jungle, but could not get sight of him. On the 19th they advanced into a country very much broken into hill and dale, with extensive bamboo growth; and it was found that the land road to Kawele (Ujiji) was impracticable on account of the rains; the river Ruche being very swift and swollen, and the mud deep. At length, on the 21st, Lieutenant Cameron got his first sight of lake Tanganyika, a grand expanse of water bounded by the distant mountains rising from the western shores. Another two hours' march, partly over a flat, intersected in every direction by hippopotamus paths, brought the caravan to the shores of the lake, where canoes were waiting. Cameron describes his impressions on first seeing the great lake, in a few graphic sentences jotted down in his rough note-book. Burton's picturesque and glowing description of the same view, which he first saw almost on the very same day of February, sixteen years ago, will be found at p. 213 of his *Lake Regions of Central Equatorial Africa.*

The place of Cameron's embarkation appears to be Burton's port of Ukaranga, separated from Ujiji by the mouth of the Ruche. The canoes were fine large boats; and in an hour and a quarter they brought Cameron and his party to Kawele (Ujiji), where he was hospitably received by the Waswahili and Wamrima inhabitants, traders and settlers of Arab extraction, from the coast. He was the first sailor and the first surveyor who ever navigated the waters of lake Tanganyika. The head-men established their English guest in very comfortable quarters. The market is well supplied with excellent fish and fruits of various kinds, bananas, pomegranates, custard apples, and sweet limes: tomatoes, yams, sweet potatoes, pumpkins and cucumbers are among the vegetables of Ujiji; and Indian corn and rice form the breadstuffs. Fowls and eggs are plentiful, and there are also cattle and sheep. The Ujiji traders were extremely cordial, and on the 24th Cameron went with some of them on a shooting excursion to the island of Bangwe; where he got a good round of angles. On February the 26th Dr. Livingstone's effects were handed over to him, including a journal and the valuable map, which he was about to transmit, by a secure hand, to the coast. On the 27th he obtained a good set of lunar observations for longitude, meridian altitudes for latitude, and observations for height from four aneroids, and seven boiling-point thermometers. His observed longitude is 30° 4′ 30″ E.; agreeing well with his longitude by dead reckoning, which was 29° 59′ 30″ E. His latitude of Ujiji, by observation, is 4° 58′ 3″ S. The height of lake Tanganyika above the sea is 2754 feet. These observations are extremely valuable, as they verify or correct those of Speke and Livingstone. Speke's longitude of Ujiji was 30° E., but it was taken with a star out of distance. His latitude was 4° 54′ 56″ S. Speke made the height of the lake above the sea 1844 and Livingstone 2884 feet.

All the Waswahili traders to the Manyuema country make Ujiji their head-quarters during the rains. They reported that travelling to the westward of the lake was impracticable until the beginning of May. Lieutenant Cameron, therefore, determined to devote the two months of March and April to a thorough examination of lake Tanganyika, for which purpose he obtained a large boat with fourteen oars and a sail; and the important geographical problem connected with the drainage of this expanse of fresh water will be investigated, for the first time, by a sailor and a trained surveyor. In May he intended to press onwards, with a party of carefully selected men, to the Lualaba; but it is possible that Sir Samuel Baker's hypothesis may be correct, and that the Tanganyika and Albert Nyanza are one water. In that case, and if in the course of his investigations he sees reason to take this view, Lieutenant Cameron may turn his course northwards, so as to connect his work with that of Colonel Gordon. Under any circumstances, he is probably on the threshold of important geographical discoveries.

Lieutenant Cameron has shown that he possesses many of the highest qualifications of an African traveller. He is well known as one of the best pedestrians in the Navy. He is a trained surveyor, and can both observe accurately for latitude and longitude, and work a traverse with precision. He has good topographical insight, and not only describes the physical aspects of a country, but applies reasoning from observed facts to solve geographical problems which are beyond the horizon of his actual vision. He received some hints respecting the observation of geology from his friend Mr. Prestwich, and has made botanical and other collections. He derives intense enjoyment from fine scenery, and is not without some literary skill in describing it. As a linguist he had already distinguished himself in his own profession, having passed as an interpreter; and he soon mastered the Kisuahili language. He is indefatigable and unceasing in his endeavours to collect information of all kinds from the people along his line of march; taking it for what it may be worth, for future comparison and scrutiny. He is a favourite among the natives, understanding them thoroughly, and having a fellow feeling for them, which they see

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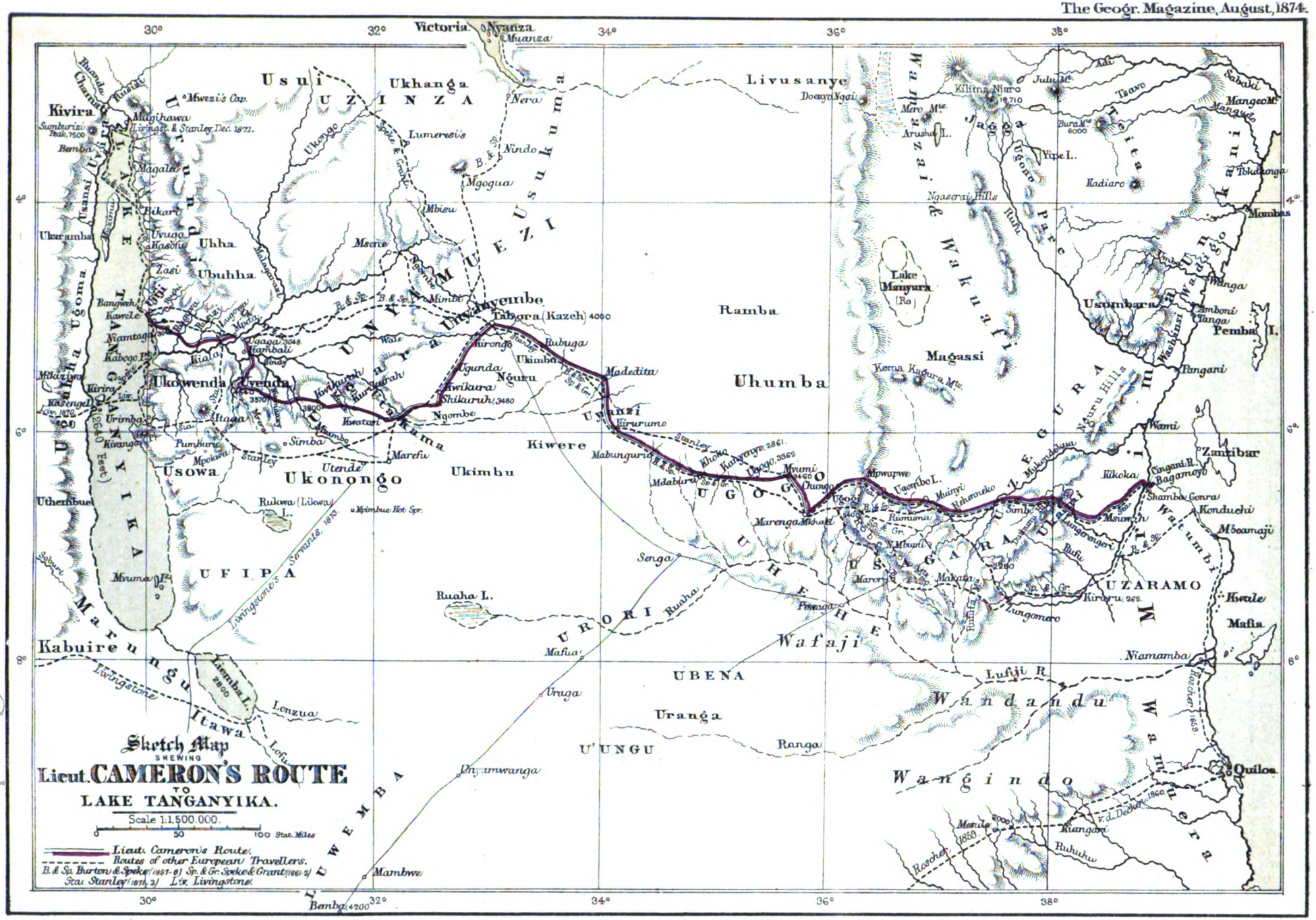
Victoria Nyanza
Muanza
Usui
Ukhanga
U Z I N Z A
Livusanye
Nera
Mweezi's Cap.
Kivira
Magihawa
Livingst. & Stanley Dec. 1871.
Sumburizi Peak, 7500
Bemba
Lumeresi's
Nindo
Mgogua
Mbisu
Msene
Uhha
Ubuhha
Ukaramba
Bikari
Uvuga
Kasoge
Zasi
Bangweh
Kawele
Niantagi
Kaboyo Pk.
Kiala
Ukowenda (Uvenda)
Kiriro
Kasengel
Urimba
Itaga
Kwangwa
Pumbura
Mpokwa
Simba
Usowa
Ukonongo
Utende
Marefu
Ukimbu
Kiwere
Uthembue
Rukwa (Likwa) L.
Mpimbue Hot Spr.
Mrumia I.
U F I P A
Kabuire
Lwangwa
Itawa
Lonzua
Lofu
Liemba L. 2600
Bemba 4200
Mambwe
Uraga
Urangá
U'UNGU
Unyamwanga
Ranga
Ruaha R.
Ruaha L.
Senga
Mafua
UBENA
Wafaji
Lufiji R.
Wandandu
Wangindo
Niamamba
Kwale
Mafia
Quiloa
UZARAMO
Kirboru, 262
Tungomero
Makata
Maroro
Rumuma
Marenga Mkali
Mpwapwe
Ugombo L.
Mwigri
Kihurueko
Simbo
Mbuni
Mlembule
Mukondokwa
Kikoka
Bagamoyo
Cingani R.
Shamba Gonra
Konduchi
Mboamaji
Wami
Zanzibar
Pangani
Usambara
Pemba I.
Mombas
Tokdonga
Kadiaro
Vine I.
Arusha I.
Miro Mt.
Kilima Njaro 18,710
Jagga
Ugono
Pare
Ruvu
Ngasorai Hills
Lake Manyara (Ro)
Ramba
Uhumba
Magassi
Kenya Kagura Mts.
Nguru Hills
Usambara
Mlanga
Kamboni
Tanga
Washasi
Wadigo
Wakuafi
Wazaramo
Wakami
Mangeo Mt.
Sabaki
Jipe L.
Kisuani R.
Kisuani
Mgeta R.
Mgeta
Kiwere
Mabunguri
Khoka
Kanyenye 2861
Lyago, 3362
Myumi 3460
Chungo
Mdaburu
Kirurumo
Madedita
Ukimba
Rubuga
Kirongo
Tabora (Kazeh) 4000
Unyanyembe
Mimbo
Ugunda
Nguru
Kwikuru
Shikuruh, 3480
Ngombe
Kwatasi
Mambo
Kwihara
Kwihara
Kwihara

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and appreciate. Nowhere is patience more tried than in travelling with African *pagazi*. But they must be led, not driven, if progress is to be made; and the kindly tact and judgment of the English naval officer is more effective than all the violence and slave-chains of which we heard so much two years ago. Yet Cameron is vigilant in the detection of theft or intended desertion, and prompt in punishing such delinquencies. The men whom he engages for service are told off into messes, and the loads are periodically examined. The pluck and determination by which Cameron has hitherto overcome obstacles which would have daunted most men, are now well known. At the outset the difficulties which surrounded him were of a peculiarly disheartening and embarrassing character, and at Unyanyembe were superadded attacks after attacks of fever of a specially severe type, accompanied by ophthalmia. Yet the gallant young explorer remained undaunted through it all; and he has continued to push onwards with the fixed resolve that the expenditure incurred on his expedition shall bear good fruit, in the shape of valuable geographical exploration and discovery.

Such is the man who is now at the advanced posts of the known region of Africa, and on the threshold of discovery. It would be deplorable if, for want of funds, his most promising career was now checked. It is not in the nature of Britons to leave a fellow countryman, who is engaged on a duty the performance of which will redound to the credit of the nation, to his fate. He is doing his work zealously and nobly; never having once faltered in his determination to fulfil the commission entrusted to him. We very earnestly appeal for support for Lieutenant Cameron; without which he will be placed in the greatest difficulty and danger. A sum of at least 2000*l.* is needed; and a subscription to meet further expenses has been opened. Subscriptions may be paid for the CAMERON EXPEDITION FUND, to Messrs. Ransom, Bouverie and Co., 1, Pall Mall East, S.W.

THE LUFIJI RIVER AND THE COPAL TRADE.

THE river Lufiji, though entirely unknown beyond its delta, is one of the most important rivers on the east coast of Africa. Rising, as is supposed, in lake Rwaha, in about the longitude of Unyanyembe but far to the south, it receives the drainage of all the southern slopes of the Usagara and Ugogo country, along which Burton's route passed from the coast to Unyanyembe, and falls into the sea opposite the large island of Mafia, about 100 miles south of Zanzibar.

Burton collected all that was known of the Lufiji, which, in its upper course, is called the Rwaha River; and he observed that the exploration of its delta was still a desideratum.* This desideratum has now been supplied. In 1873 Dr. Kirk and Captain Wharton, of H. M. Surveying Ship 'Shearwater,' explored the Lufiji Delta† in a steam launch; and this year it was again explored by Captain Elton, First Assistant to the Political Agent at Zanzibar, who has also furnished some very interesting information respecting the *copal* diggings to the south of the port of Dar-es-Salam.

* *Royal Geographical Society's Journal*, xxix., p. 44.
† *Royal Geographical Society's Proceedings*, January, 1874.

The *Msandarusi*, or copal-tree, according to Captain Elton, is largely scattered over an extensive tract of country, in the Mrima or coast region. This tract lies along both banks of the Lufiji, and extends from the mountains to the sea, a belt from 30 to 35 miles wide. Throughout these limits immense quantities of the semi-fossil are dug up by the natives, and this constitutes the most lucrative commerce of the Indian settlers at the small trading ports. Further south, beyond the Lufiji, there is a break in the supply, attributed by Captain Elton to the surrounding slave traffic, which rapidly drives legitimate commerce out of its course, but also affected by the increased difficulties of communication caused by the marshy swamps which here fringe the coast more deeply than above the Lufiji. Beyond Kilwa copal again appears, and is largely bought up, in tranquil times, at the numerous trading stations which dot the sea-board down to the Rovuma River.

The copal-tree is described by Burton as a large tree, the towering bole of which has formed canoes 60 feet long. The bark is smooth, the trunk of a yellowish white tinge, rendering the tree conspicuous amid the dark African jungle growths, and is dotted with exudations of raw gum, which is also found scattered in bits about the base. The forests, called *kiregesi*, contain many *msandarusi* or copal-trees, and between them, in the broad transverse glades which always intersect African woodlands, some of the finest fossil-gum is dug. This never reaches the trader, however, without a large admixture of the copal from the neighbouring trees, and the contents of the digger's basket are made up with wet sand and small stones, in order to give it a little extra weight. The chief centre of supply is the Kwale district, where there are eleven stations for carrying on the copal trade. In the early morning strings of natives are seen on the paths, each party led by a few men armed with old muskets and bows and arrows, and consisting of women and lads, carrying copal baskets. Except during the very dry season, these arrivals take place daily, but there is no organized system of working. The Indian traders do not venture to send out parties of their own, for each village and each working is represented by a head-man, and the natives are only too ready to unite against the slightest encroachment on their monopoly. The "trade union" system is here represented in its strongest form.

Below 4 feet no gum is found worth taking, and very few diggers go beyond 3 feet in search of it. The trade appears to be surrounded by many difficulties. The Indian trader, on the Mrima coast, has many extortions to contend against, and heavy duties to pay; besides the continual haggling with the natives, competition with his neighbours, and a perpetual round of coast fevers. The local village head-man extracts a ground rent from him; and he has to pay an arbitrary per-centage on his profits, and 20 out of every 100 *frasilahs* of copal shipped as an export duty. The cost is from 3 to 5¼ dollars per *frasilah* of copal, varying according to the season of the year, and at Zanzibar the merchants buy at from 7 to 8 dollars. Yet, in spite of all difficulties, the trade prospers; and Captain Elton is of opinion that the inexhaustible supply of copal, under a settled rule, and with systematic working, would furnish the means of supporting a far larger community than that which is now sparsely scattered along the coast.

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In old days the trees would appear to have lined the shores, but the extent of the ancient forests can now only be estimated by the area of the present workings, and by the positions of the existing *msandarusi* which are found away towards the foot of the low hills bordering the Mrima, and on all the terraced lands sloping down from the ridges to the present sea-beach. *Msandarusi* is the true or ripe copal, the produce of vast extinct forests, and buried at depths beyond atmospheric influence. The raw or tree copal is called *Chakazi*. It is little valued in European markets, but is exported to Bombay and China. A most interesting account of copal and the copal trade is given by Captain Burton in his *Lake Regions*.*

After visiting the stations of the Indian copal traders in the Kwale districts, Captain Elton entered the Simboranga mouth of the Lufiji River in January 1874; and then examined the other mouths. The various embouchures of the Lufiji are the Simboranga, Saninga, Twana, Gumba (called Mzinga on Captain Wharton's chart) Kiazi, Mbwera-barra, Jaja, and Mbombwe. Of these the Simboranga, Bamba, and Jaja appear to be main streams; of which the Simboranga is the broadest and the most used. The low mangrove-clothed country along the sea-face of the delta has many villages, and is thickly populated by a race who, during the inundations, must live half their time in the water.

Captain Elton commenced his examination of the Lufiji from Samanga at its mouth, where the Banyans tried to dissuade him from the journey, asserting that the natives of the river were badly disposed and suspicious, and had been worked up by Arab reports against his visit. He paid no attention to this at the time, but he found in the end that there was some truth in what the Banyans had said. He was accompanied by Sub-Lieutenant Pullen, of H.M.S. 'Shearwater,' as a volunteer, who, notwithstanding severe illness, was most indefatigable in taking observations and notes. Leaving Samanga, they proceeded north on the caravan road, and passed through the villages of Kuajo, Murengo, and Furu, which communicate with the sea by creeks, and carry on a considerable trade with the interior. At Murengo two slave caravans were met, one of 200, the other of 100 slaves, but nothing unpleasant occurred, the head-men of the villages coming out as well as the Indians to salute them on all occasions.

From Furu the path strikes through a forest country, and is choked up with coarse high grass and undergrowth. Here, for a considerable distance, no signs of cultivation were seen, water being scarce; indeed, missing the road in the thick brushwood, it was not until near sun-down that they found a muddy pool and made their first meal for the day. A few villages and patches of cultivation then appear, the Matumbwi range to the westward assuming larger proportions until a wide plain is entered, spreading from the low hills towards the distant delta country. Covered with brushwood, and bounded by the blue mountain ranges, now rising to a height of about 6000 feet, the change of scene is abrupt and pleasant, although the narrow path is difficult, and obstructed by ravines and mud holes to such an extent as to make their journey across it occupy two hours, the distance being about 3 miles. Mohoro is then reached, a village on the river of the same name (Pemba Utagiti), surrounded by rich fields of maize and millet, banana and fruit trees. Three Indian settlers carry on a lucrative trade in copal grain, and *sim sim*, the fertility of the district lying between the two rivers being extraordinary. Maize, rice, millet, ground-nuts, &c., are largely cultivated; and, although during a portion of the year the lands are subject to inundation, failure is not remembered, and heavy crops confidently relied upon. Sheep, cattle, and goats thrive, and are bought for export *viâ* Samanga.

Through this land of plenty three hours' march brought Captain Elton and his companion to the banks of the Lufiji, the high, waving Indian corn hiding the river from view. As they emerged on a belt of coarse, thick grass and rushes they first saw it, and were greeted by shouts and screams from the slaves of a caravan which was preparing to cross the ferry. The Arabs took fright at their arrival, and some made for the canoes, driving off the gangs, whilst the others prepared to cover the retreat; however, after a little talking, the leader moved every one away, and, within half an hour, had shipped the whole party (65 in number) into the crazy ferry boat, which charges a dollar for every four slaves taken across.

They then chose a large tree near the bank for a camp, and their men were cooking breakfast, when crowds of natives trooped down from the adjacent villages. In less than ten minutes they were surrounded by about 800 men, more than half of whom were armed with guns, the rest carrying spears and bows, and headed by a man who approached and sat down near the tree. He commenced operations by making a long speech on the merits of the Lufiji tribes (an exceedingly ill-favoured and dirty race, even amongst East Africans), lauding them as a fierce and dangerous people. "Did not the Arabs fear them? Had not the white men in the steamboat turned back to the sea from Fugulia (Dr. Kirk and Captain Wharton)?" He then asked why Captain Elton had come. "To fight with a caravan and interfere with the slaves, and close the road, when the country would be ruined? To take away the trade and the boats? They wanted to know what he could say; they heard there was to be a fight, and they would join the fight."

Finding the man was only a messenger, Captain Elton told him when the chiefs came to see him he would speak, but that he wanted to eat, and could not afford time to talk to him. In the end the three head-men of the country arrived, and, in about three hours after the armed men had been sent away, a complete peace was made and ratified by exchange of presents —blue and white calico and turban cloths on the one side, and rice and vegetables on the other. The old man of the three up to our leaving muttered to himself about the evil days that we should bring on the Lufiji.

Captain Elton and Mr. Pullen struck the river at Mpenbeno, on the only caravan route, a group of villages above the delta, and some 10 miles higher than Fugulia, reached from the sea *viâ* the Simboranga by Dr. Kirk and Captain Wharton. The river here is about 260 to 300 yards in width, with a current running about 2 knots, and, from soundings taken by

* *Royal Geographical Society's Journal*, xxix., p. 435.

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Sub-Lieutenant Pullen, R.N., averages 3½, and runs to 4 and 5½ feet in depth at this, the driest season of the year.

The scene was very African; the broad flats, covered with rich crops, glittered in the sun, dotted over with baobabs and fig-trees, here and there a shady grove marking a group of villages; to the north-west rose the lower hills, from which the white smoke of large grass fires stood out against the purple ranges of the Matumbwi Mountains in the background; to the north and north-east the highlands of the Mtote and the coast ridge behind Kikunia were visible; whilst through the midst of the enclosed plain rolled the Lufiji in rapid bends and with one long reach past Mpenbeno. An island with steep banks and covered with brushwood is a prominent feature, and a few sand banks fringed with long rushes, infested, the natives say, with crocodiles, are not promising signs of depth. There are no rocks or rapids to be found for twenty days' journey, where, from the descriptions given me by a man who came from the upper country, the Matumbwi Hills are probably passed through gorges. Hippopotami are rare, and game scanty, owing to the many villages which line the banks far into the interior.

The country is healthy, but suffers from the inundation of the river, when fevers are prevalent. Copal is collected in the neighbourhood, and large quantities of wax; ivory comes down but irregularly, cereals being the produce of the alluvial lands and the mainstay of trade. Large tracts of land exist where the sugar-cane might be grown advantageously, and transport by water could be made available; the Arabs, however, have no hold on the country, the native tribes being in undisputed possession.

From here to Kikunia is called seven hours' journey, and a bearing of the hills, distinctly visible on the horizon, gave the direction of the road which crosses two unimportant rivers, the Nkora and the Rohe. The village of Fugulia is three hours distant in a canoe, six by land according to the natives; and in this case the river must wind considerably, which apparently is the case. Canoes, however, are used only for the ferries, in consequence of the strength of the current. "How can we get them up again," said the Chief, "when they get down? We walk when we travel." Coal is reported to exist five days' journey inland, the seam being visible on the bank of the river. The Indians all believe this to be a true report, and show specimens of the coal, some of which reached Zanzibar, and, I think, even Bombay.

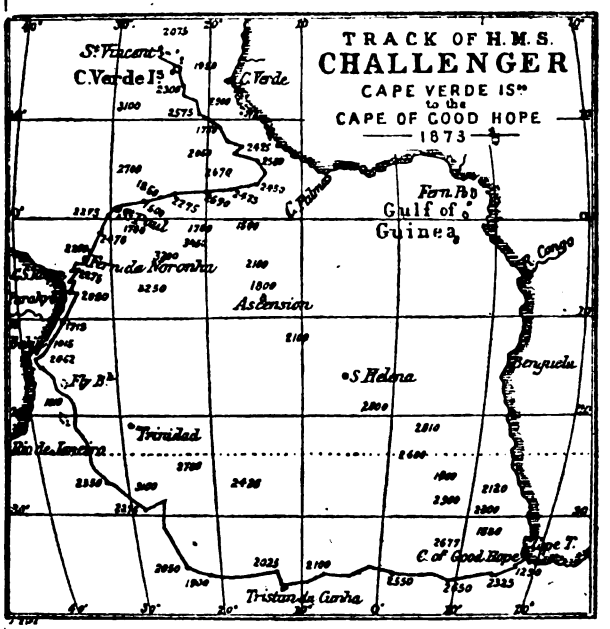
Unless coal was discovered worth the working, Captain Elton does not think that it would be worth while to expend money on the Lufiji. During the dry season, like most African rivers, it is a snare and a delusion; sand banks and shoals and an average depth of from 4 to 5 feet do not look well, even in the driest season, yet, if after a visit to these coal localities, the future looked promising, it would become a question whether steam launches could stem the strong current, and at what seasons and how far they could ascend.

He thinks that no attempt should ever be made to put a stop to the slave caravan route on this river: great exposure and loss of life would be certain, and success, owing to the intricacies of the delta and the opposition of the natives, doubtful.

THE VOYAGE OF THE 'CHALLENGER.'*

III.

IN the October (1873) number of *Ocean Highways*, the narrative of the voyage of the 'Challenger' was brought down to her arrival at Cape Verde Islands, at which place she arrived on the 27th July, last year. Between Madeira and Cape Verde Islands, soundings and serial temperatures had been obtained at about every 100 miles, the deep water continuing close up to the islands; but between the islands of St. Vincent and St. Antonio, Cape Verde's, the soundings indicated a connection by a ridge with shallow water over it.



A tidal current was found between the islands. During neap tides the surface current turned to run north (to windward); three hours after, the tide commenced to rise, and ran for five hours at the rate of one knot an hour. The bottom water turned to run north more than half an hour before that on the surface, and ran 6¼ hours; the water at the bottom, therefore, may be said to be unaffected by the trade wind, which, on a fine day, but following three windy days, was sufficient to retard the tidal movement of the surface 1¼ hour.

Very few supplies were obtainable at these islands, there having been but little rain for three years, and numerous skeletons and even dead bodies of goats seen on the plains bore evidence to the precarious existence of life.

Captain Nares having been informed that a trade in pink coral existed from Porto Praya, St. Jago, a boat was sent to dredge over the locality in which it was said to be found, and a few specimens of red coral, similar to that common in the Mediterranean, were obtained, but no pink coral. The same temperature (52°) was found at the depth at which the coral grows, viz., at 80 fathoms, as that in which it exists in the Mediterranean, and which had not been found at the same depth further north. From this

* Much of the information contained in this paper is derived from the *Extracts from the Reports of Captain Nares.*

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conformity of temperature it is supposed that red coral exist.

On leaving Porto Praya, on the evening of the 9th of August, a line of soundings was taken to the south-eastward, on a course nearly parallel to the African coast, to a position in latitude 3° 8′ N., longitude 14° 49′ W., at which position the south-east trade-wind obliged the ship to stand to the westward for St. Paul's Rocks. At a distance of 95 miles from St. Jago a depth of 2300 fathoms was found; this increased to 2575 fathoms abreast the Bijouga Islands, which was the deepest water obtained on this line of soundings, 2500 fathoms being the depth at the termination, in latitude 3° N., then 130 miles from the African coast, abreast Sherboro Island. From this towards St. Paul's Rocks, there was no great change in depth, until within 300 miles of the rocks, when the water shoaled to 1850 fathoms, and then 1500 between that and the rocks, the bottom generally consisting of globegirina ooze.

The north-east trade-wind was lost in latitude 12½° N., longitude 23° W., and in the same position the Guinea current was felt, but instead of setting to the south-eastward, it was found running to the northward of east. The equatorial current was met at the termination of the south-easterly course, and continued across the Atlantic to within 400 miles of Cape St. Roque, the speed varying from half, to two and a half knots an hour.

The 'Challenger' reached St. Paul's Rocks on the 27th August, and, secured by an eight-inch hawser to the lee side of the rocks, remained until the morning of the 29th, during which time the rocks were thoroughly examined, a matter of by no means easy execution, as a current was constantly running to the west north-west the water banking up and accumulating against the weather side of the islets, rushed past each end at a rate of at least three knots an hour, causing a confused sea and an eddy tide-race under the lee, and this to such an extent that the boats were unable to pull to the windward side of the rocks.

These rocks have been frequently described: they are a cluster of islets grouped in the form of a horse-shoe, the whole extending no more than a quarter of a mile north-east and south-west. The highest is only 60 feet above the level of the sea, and is covered with a mixture of phosphatic matter produced by birds and sea-salt, forming a species of varnish. The other rocks are more or less covered in the same way.

Landing was at times difficult, for the continuous rollers produced by the south-easterly swell recurring round the points, enter the bay, producing a confused sea. A bottle was found on the large rock containing a paper, stating that Captain Pack, of the ship 'Ann Millicent,' of Liverpool, had landed there on July 19th, 1872.

The nature of these rocks is somewhat similar to the serpentine of Cornwall. They appear to be a mixture of forms of felspar and silicates of alumina and magnesia. Two species of birds only were seen—the "booby" (*Sula fusca*) and the "noddy" (*Sterna stolida*): they were in myriads, and so tame that they could be caught by the hands. There were numerous nests of the noddy, made of seaweed; a few had eggs or young ones in them, but the breeding season was evidently past. No other animals were found save a small scorpion, a few crabs, spiders, and parasites of sea birds. Of vegetation there was none, not even a lichen could be discovered. Great quantities of fish were taken, and those enemies to sailors—sharks—were numerous.

It had been proposed to erect a lighthouse on these rocks as a memorial to the late Captain Maury, of the United States Navy, who in his lifetime had rendered such good service to the maritime world, and Captain Nares examined the site in relation to that proposal. He reports that "there is an excellent site, requiring very little preparation, on the south-west islet, 10 feet above high-water mark, consisting of a flat surface, 100 feet by 40 feet, conveniently placed. With a derrick, the immediate landing would be easy during the northern summer. Any of the present small rocky hillocks, rising from an uncertain rocky base, would require considerable work to reduce them to the necessary 20 or 30 feet before a base of sufficient size for a foundation could be obtained. If this were undertaken, an additional elevation of 20 or 30 feet would be gained, but the expense would not compare favourably with the work"; and as the rock of which the islands are composed is not fit for building, even if the expense of supporting labour at such a distance permitted it to be used, and as there is no fresh water procurable, it is not probable that the proposal will ever be carried into effect.

From St. Paul's Rocks, soundings were taken in the direction of Fernando Noronha; 2200 fathoms were obtained towards either end of the line, and 2475 fathoms midway between them.

On arriving at Fernando Noronha (which is a penal settlement of Brazil), the Commandant gave permission to Captain Nares to survey and explore the island for scientific purposes; but on the following morning, as the scientific corps were about to leave the ship, a message was received from the Commandant, withdrawing the permission he had given the previous evening. Captain Nares remonstrated with him, but to no purpose. He stated he could not take the responsibility, but said they were free to come and go and walk about the island, and would even supply horses, but would not allow a butterfly or a single plant to be collected without previous permission obtained from his superiors. As that was out of the question, and there was nothing to be gained by delay, much to the regret of the naturalists and botanists, the 'Challenger' weighed anchor and left the island, sounding to the south-west.

The ground to 19 miles from the island was very rocky; beyond that distance there was 2150 fathoms with a bottom of ooze, this proving that there is a deep water channel between Fernando Noronha and Las Rocas. The water deepened to 2275 fathoms midway between Fernando Noronha and the Brazil coast, shoaling again to 1375 fathoms near the coast. Soundings were continued parallel to the coast of Brazil towards Bahia, at which port the expedition arrived on the 14th of September.

Without stopping to sound or dredge, the 'Challenger' proceeded thence to the southward until she was off the Abrolhos Bank, when a sounding was obtained in 2150 fathoms. It was the intention of Captain Nares to have visited Trinidad, but the wind keeping to the westward, he was unable to get within 350 miles of that island, and the necessity of getting the ship into a colder climate was considered so urgent, that the idea of making for it was given up.

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On the 3rd of October, in latitude 26° 15′ S., longitude 32° 56′ W., soundings were obtained in 2350 fathoms, and afterwards the trawl was let down: on heaving in, the strain was much greater than usual, and great care and patience were necessary to bring it to the surface. Great excitement prevailed, particularly in the scientific corps, who were indulging in the prospect of a rich prize, and all were speculating as to what the contents of the trawl could possibly be, and, among other conjectures, the great sea serpent or a mermaid had their share. However, the curiosity excited was not doomed to be gratified, for just as it came to the surface, and the men were hooking the *burton* to hoist it inboard, the swivel between the chain attached to the trawl and the dredge-rope parted, and the trawl, and its doubtless valuable contents, sank to the bottom, thus affording another opportunity to the philosophic mind to practise its own philosophy.

On the 6th, at a distance of 300 miles from the last sounding, another was obtained in 2275 fathoms; and on the 10th another, 400 miles from the last, of 2050, from a white clay bottom; and the next day, in 1900 fathoms, the trawl brought in a rich haul of fish, prawns, corals, star-fish, &c., much to the delight of the naturalists.

At daylight on the 14th of October Tristan da Cunha was sighted, and a sounding taken in 2020 fathoms. Not arriving near the island until 10 at night, the ship *lay to* until the morning, and then anchored off the settlement.

Tristan da Cunha is the only inhabited island of the group, and contains eighty souls in all. Originally a corporal's guard of Artillery were stationed at the island during the captivity of Napoleon Buonaparte at St. Helena, although what service they could have rendered there, at a distance of 1300 miles, it is difficult to conceive, excepting that it was well known that all manner of mad schemes were proposed for the escape of the illustrious prisoner, and it was feared that some projector might make Tristan da Cunha his head-quarters, to mature his plans, and make the attempt. Suffice to say, that when the prisoner died and the soldiers were no longer retained, a corporal and another soldier, with their wives, volunteered to remain on the island, since which time the population has increased by births and emigration from the Cape of Good Hope. Confined to a low peninsula, backed by cliffs 1000 to 1500 feet high, and difficult to climb, the inhabitants are enabled to grow sufficient potatoes, and to find pasturage for numerous sheep and cattle, but for corn and other necessaries they are entirely dependent on passing whalers, in barter for their meat and potatoes. The eggs of the Molly Mawk *(Diemedia chlororynchus)* are a staple article of food in the breeding season.

The inhabitants look healthy, and seem contented; occasionally one leaves in a passing vessel for the Cape of Good Hope, and an old lady of seventy years of age proposed going thither in the 'Challenger'; but this was respectfully declined. The first Governor, Corporal Glass, has been dead many years, and, although there is no recognised chief, the oldest man, at present one Peter Green, is tacitly acknowledged as such, acting as spokesman and salesman on all occasions when necessary. The property of the islanders is considerable, consisting of about 600 head of cattle, and about the same number of sheep. They have a plentiful supply of poultry and pigs. As fresh provisions are always welcome on board ship, it is surprising that so few vessels call for supplies; perhaps the cause may be assigned to the islanders themselves, who, to ships that have not time to wait, drive rather hard bargains for their commodities.

The houses are neatly and well built of the soft stone of the island, dovetailed together to withstand the force of the winter gales, no mortar being used in their construction; the roofs are of thatch of long grass, topped with sods of turf.

Captain Nares was informed by the inhabitants that nearly two years before two Germans had landed on Inaccessible Island—one of the three islands of the group, about 20 miles to the south-west of Tristan da Cunha—and as no communication had taken place between the two islands for a long time, it was doubtful if they were in existence. This information induced Captain Nares to visit the island, and leaving the anchorage at 4 P.M., at 10 they stopped off Inaccessible Island. The next morning, being off the east side of the island, a hut was observed on the beach, and a boat was sent in. As she approached the two Germans were seen standing on the beach, a little to the northward of the hut, evidently hesitating as to what they should do. As all men act who for a long time have existed without intercourse with their fellow creatures, they seemed to doubt whether their visitors were disposed to be friendly, but they were seen to walk towards the boat, and gladly accepted a passage to the Cape of Good Hope. The story of their long sojourn on the island, although it reads like another of Defoe's tales, has the advantage over *Robinson Crusoe* that it is substantially true in every particular.* It seems that the younger of the two Germans, Gustav Stoltenhoff by name, had been a seaman in the ship 'Beacon Light,' in 1870, and when on a voyage from Scotland to Rangoon, the ship had caught fire when between 600 and 700 miles from Tristan da Cunha. She was steered for the island, and the fire kept under for three days, but on the evening of the third day the hatches were blown off, and, as the ship was no longer tenable, the captain and crew were obliged to take to the only remaining boat, and, with a small supply of provisions and water, started to make their way to the island, then considered 300 miles distant; but it is supposed they must have been much nearer than that, as, two days after, they made the peak of Tristan da Cunha, and being seen from the island, a boat went to their assistance, and they were taken in tow to the island, where they were kindly received by the inhabitants. Eighteen days after, they were taken off by another ship, and landed at Aden.

From Aden young Gustav made his way back to his native country and birthplace, but only to find his family ruined by the war, and his brother, who had served in it, a beggar and without occupation.

Doubtless, the few days the young sailor had spent among the friendly people at Tristan da Cunha had been most agreeable; the free and easy life, and the absence of troubles, must have impressed him strongly, the more so from having, at the time he was there,

* We are indebted to one of the officers of the 'Challenger' for the incidents of this narrative.

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just escaped from very great danger by fire and water, and as the brothers had to make a new start in life, and all prospect of doing so at home being very gloomy, the younger proposed to the elder that they should make their way to the island he had such kindly recollection of and take up their abode there, away from all the turmoils of civilized life; to this the elder consented, and they worked their way to St. Helena, from which island they could obtain a passage to their destination in a whaler.

At St. Helena they expended their little stock of money on an outfit suited to their new life, and among other necessaries became the owners of an old whale-boat, the best they could get for the money at their disposal, and in November 1871, embarked with all their treasures for Tristan da Cunha in the American whaler 'Java,' Captain Mander. On the passage, the captain, from some unexplainable reason, worked so strongly on the minds of his passengers as to persuade them to land on Inaccessible Island instead of the one they were bound to. Captain Mander described the island as fertile, and having a valley that led from the beach to the summit, and that on all occasions when he had landed he had seen numbers of wild pigs and goats.

The brothers were landed on the 27th November, 1871; their stores consisted of their whale-boat, some rice, flour, biscuits, sugar, tea and coffee, some salt, a little tobacco and pepper, and a small supply of spirits and wine, some empty barrels for oil, lamp, matches, a rifle, fowling-piece, shot, powder, &c. They also had a few tools, a wheelbarrow, cooking utensils, some seed potatoes and garden seeds, a dog and pups, &c. Their library consisted of eight or ten volumes of very miscellaneous reading with which they got intimately acquainted before they left the island.

They were landed on the shingle beach on the west side of the island, from which by a ravine there was very difficult access to the summit of the cliffs. Four days after they landed, a party of sixteen men, in two boats, arrived from Tristan da Cunha. The 'Java' had been becalmed off that island, and the captain had given information of the landing of the two brothers, and as the sealing season had set in, the Tristan da Cunha men set out at once for Inaccessible Island; they behaved with much kindness to the brothers, pointed out that the position they had chosen on the north-west side of the island exposed them to prevailing winds, and advised them to shift their quarters to the north-east side, which they at once agreed to do, and the Tristan da Cunha men took all their stores round, and showed them how to build a hut, and soon after left them, promising to visit them at Christmas, and the brothers at once set to work building their house near a waterfall, clearing the ground, and planting their seed, and otherwise making preparations for a long stay. Firewood was plentiful, being only of one kind *(Phylica Arborea)*, which although always green, burns well; and by aid of the long grass they could reach the summit of the island, where there were about four miles of broken, uneven ground. The beach was about a mile long, with a strip of ground back to the foot of the cliffs.

Using the boat, they captured nineteen seals, but were unable to *render* the blubber. The month of November is the pupping season; the males land first and afterwards the females or clapmatches, and when they have given birth to their young, and the new generation are able to shift for themselves, they all leave the island. *Par parenthesis*, it may be remarked that the seal makes a very affectionate mother, as the young when first born are unable to swim; the mother may be seen with her young one in its mouth literally teaching it, and even when unable to go by itself, the mother may be seen swimming about with her one or two young resting on her back; and it is a pretty sight to see the mother land her young by taking it in her mouth paddling about until a swell raises her high enough to deposit her progeny in safety on the rock.

The first house built by the Stoltenhoffs, failed to keep out the rain, and they had to build another; but while thus working hard at their houses and plantation, they were quickly consuming their store of provisions without replenishing it, and they soon became fully aware that the time would arrive when they must be entirely dependent on home produce. They occasionally used their boat in sealing, but unfortunately she was too heavy for two men to handle, and got so damaged that they could only keep her afloat by constantly baling. This was a momentous event to the poor fellows, as in the beginning of April, 1872, the tussock grass growing on the cliff at the back of their hut, and by means of which they were enabled to get to the summit of the island, accidentally caught fire as they were clearing their ground by burning, and the only way left them of ascending was by going round to the north-west side in their boat; thus by the accident to the boat their means of existence was cut off; however, nothing daunted, they cut their whale-boat in two and built up a stern on the best half, and christened their extraordinary looking craft, the *Sea Cart*, and by means of the Sea-cart, they were enabled to get round the point and to the summit of the island, on which were pigs and goats; they found the flesh of the latter extremely good, but that of the pigs was unpalatable owing to their feeding partially on sea birds.

On the 14th of May an English ship hove in sight, and a fire was lighted to attract attention, as their boat was not safe to go outside the kelp in. The captain afterwards reported at Tristan da Cunha, that he had seen two persons on the island, also a square-sterned boat, but that no one came off, and that there appeared to be too much surf for him to attempt a landing.

The poor fellows' hearts sunk within them as they saw the ship bear away from the island, as winter was setting in on them with heavy gales and much rain, moreover in one of the gales their sea-cart was washed off the beach and wrecked, leaving them no means of getting to the accessible side excepting by swimming round a high bluff: this great loss occurred in June. In May they dug their potatoes, and in the following month some of the other vegetables were fit for food; but being unable to reach the top of the island, the store of provisions became so reduced that they were obliged so to reduce their daily allowance, that towards the middle of August they were greatly reduced in strength. Although fish could be caught in plenty at a little distance from the shore, but few could be taken from the rocks, so that the loss of their boat stopped that means of supply.

In the middle of August, the male penguins landed to prepare their nests for the season, and at the beginning

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of September were followed by the females, who began laying; and, strange to say, the day before this happened the brothers had eaten their last potato, and but for the timely supply of eggs for food, would have perished.

In September, a passing French vessel communicated with them, and, in return for some penguins' eggs, they obtained about half a hundred-weight of biscuit, and were disappointed of a further supply of stores by the captain putting to sea. In October (1872), a sealing schooner, named the 'Themis,' communicated, and landed six men from Tristan da Cunha. The captain of the 'Themis' gave the brothers a small quantity of salt pork, biscuit, and tobacco. On leaving, the captain promised to return in a few weeks' time, but did not do so. At the end of October, the supply of penguins' eggs failed, and on the 10th of November the biscuits and pork were finished, and necessity obliged them to make preparation for swimming round the bluff in search of food. Their powder, matches, and other things requiring to be kept dry, were secured in a cask, which they towed round the bluff. The night was spent at the foot of the cliff, and the following day with great difficulty they succeeded in reaching the ridge, and, crossing over to the west side, descended to their first landing place. A pig was shot, and they enjoyed a hearty meal of fresh meat, the first they had partaken of for many months. In this way they lived until the 10th of December, having shot six goats. A hut was built at this time on the plateau to shelter themselves when hunting.

An American whaling schooner visited them, from which they obtained some small supplies, but they would not take that opportunity of leaving the island, expecting the return of the 'Themis.' A party of Tristan da Cunha men also landed on the west side, and captured no fewer than forty seals. During the stay of the party, they shot eight of the remaining twelve goats, and, on leaving, assured the brothers that the 'Themis' would most certainly call the next month. Although anxious to leave the island, the brothers were unwilling to go to Tristan da Cunha, feeling that they would not be welcome; and as these were the last people they saw before they were rescued by the 'Challenger,' they were therefore ten months without communication with their fellow men.

In January 1873, Frederic again swam round the bluff, mounted the cliff, and succeeded in shooting four pigs: these were thrown over the cliff to the brother below: he refrained from shooting the remaining four goats. At the end of the month Frederic rejoined his brother, and the day after he did so a party from Tristan da Cunha landed on the west side, and either shot or caught the remaining four goats, which they took away with them. They did not communicate with the Germans, and as this was intentional, the brothers considered that their object was to drive them from the island. Probably the Tristan da Cunha people considered that their residing on the island interfered with their hunting-ground; at all events, after their kindness to them on arriving on the island, their conduct was at least inexplicable.

In February, potatoes and other vegetables, mixed with pigs' fat, formed their daily food, but in March, that food being exhausted, another visit was paid to the plateau, and the goats were then missed, which they had abstained from shooting, but they shot several pigs. At this time, their one great comfort, tobacco, failed, and this to a German is more than we English should feel; they tried to replace it by dried leaves, but without success.

The dogs which they had brought on shore broke loose, and played sad havoc among the penguins, killing great numbers, and as one was apparently mad, the three were shot. It was now decided that the brothers should separate for a time, the elder to remain on the plateau to provide food, whilst the younger remained below to melt down and store the fat, and attend to the clearing; the want of salt prevented curing the flesh. Three young pigs had been caught and got down the cliffs without injury, then secured to a cask and towed round the point, but were nearly drowned on their passage; they were placed in a sty, and fed with grass and what could be spared from the garden, and also with penguins' eggs, when procurable.

At the end of April, the elder rejoined the younger, and in the attempt to convey two more pigs round the bluff, was nearly drowned; the pigs were so. In June, Frederic again went to the plateau, and remained there until the 18th of August; the brothers were not altogether without communication during that time, for excepting when the noise of the wind or surf prevented, they could hold a kind of conversation. In June, July, and August, they lived on pigs' flesh only; the penguins then began to lay, and in their eggs they had abundance of food until the 16th of October, when the arrival of the 'Challenger' terminated their exiled existence.

Having embarked the two Germans and their little belongings, the 'Challenger' proceeded to the third island of the group, Nightingale Island, about 12 miles distant. Unlike Inaccessible Island, the peak, which rises from the centre of the island to 1100 feet, is accessible by an easy and gradual rise on all sides. The tussock grass is 6 or 8 feet high. From the sea the island appears to be covered with turf, and made the voyagers long for a run over it, but on landing their hopes were quickly dispersed, for the apparent turf proved to be nothing more than the long tussock grass above mentioned. At the foot of the tussock grass were innumerable penguins breeding, which were not seen by the explorers until they were fairly amongst them; thinking to avoid them they pushed through the long grass, but as they proceeded the penguins were so thick, sitting on their nests, that it was impossible to avoid treading on them, or otherwise disturbing them. This the penguins resented by attacking the invaders on all sides, picking at their legs most unmercifully, and their beaks being sharp and strong, it required good boots to protect their legs from their repeated assaults, whilst the noise—which is described as between that of a pig being killed, and a kid that had lost its dam—was deafening. The progress was slow, as at every few yards they had to stop to kick the birds. It was impossible to estimate the number of birds, as, looking down from the summit of one of the out-lying islets, every square foot of ground seemed to have its penguin. There must have been millions of them. In the evening all returned to the ship thoroughly disgusted with their day's experience of penguin life.

The next day (18th October) soundings in 1000 fathoms were obtained between Nightingale Island and

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Tristan da Cunha; the dredge did not reveal any new form of animal life.

Between Tristan da Cunha and the Cape of Good Hope the weather prevented sounding so frequently as was wished: the four obtained on the 20th, 23rd, 25th and 27th, proved the existence of a deeper channel on that side of the South Atlantic than was found on the west side. The 'Challenger' arrived at the Cape of Good Hope in the afternoon of the 28th October, but the authorities placed the ship in quarantine, whilst they debated as to the propriety of granting pratique, from the fact of there having been a case of yellow fever on board thirty-five days before!

The results of the explorations of H.M.S. 'Challenger,' in the North and South Atlantic, may be considered as twofold, viz., that relating to natural geography in the form and contour of the ocean bed, and that pertaining to physical geography as developed by the serial and bottom temperatures, which will be more or less influenced by the observations on specific gravity and the analyses of the water from the various depths; but it is not too much to advance, that the effect of their consideration will not be sufficient materially to alter the deductions drawn from the isotherms as observed, as every dependence can be placed on the record of the protected thermometers.

J. E. DAVIS.

SIGN-POSTS ON OCEAN'S HIGHWAY.

II.

BASALT.

"The stony rocks are not primeval, but the daughters of time."—*Linnæus.*

"A man without a mental picture is unfit to be a philosopher."—*Tyndall.*

WE passed many years of our life amongst the basaltic regions of India; broken sided, blocky-topped highlands, with great tors sticking up in one place, and tall spire-like columns in another. As we roused the spotted leopard from the cactus thickets on the hill side, as we followed the wild boar over the hill tops, strewed with basaltic blocks from the size of a hat to the size of a house, we could not avoid seeing that the fragments round us were the remains of higher places; vast mounds, heaped up in utter confusion, told of broken tors, long lines of shattered rocks told where lofty spires had fallen. Some fragments were angular, telling of late fractures; some were worn on the edges, telling of long exposure to the atmosphere; some were worn by longer time into three-sided boulders, resting on a still angular base, evidences of an unmoved condition for thousands of years. There were cracks on the surface rock, fresh and sharp, others with well-worn edges; the whole scene pointing to a long continued, never ceasing, breaking up of the basalt surface rock under the never resting forces of ordinary denudation; these were a hot sun, heavy rains, the growth of vegetation, acid percolations, and old time.

Buddhists and Brahmins have been busy with these rocks for more than two thousand years; vast cave temples have been hewn out of their hearts by mallet and chisel; great shrines, full inside and out with strange figures, man's ideal gods and demons, satisfying for long years the human instincts of hope and fear, are carved there from the black basalt, the outward and visible sign leading the inner hearts of some to their unseen Bugwan, our God.

However antiquated some of these oriental customs may be, we cannot help respecting so long, so devoted a love; we cannot help seeing that it is the result of an early practical lesson inculcating a duty beyond which the simple wants of nations have never gone; the simplicity and the sameness run through the people. The man who gathers stones on the mountain brow now, the sculptor of idols now, and the priest who officiates at the shrine now, are the adopted or lineal descendants of those who did the same things thousands of years ago; each man uses the same pattern of utensils, the same kind of water-pots as were used in their beginning.

These men are full of their trade traditions. We asked them how these basaltic rocks were made: the ordinary reply was, "by the Bugwan." A spare, dull-eyed ascetic, in a small temple at a hot spring near Arawud, in the Syadra range of mountains, a solitary human being amongst the wild beasts of the jungle, replied to our persistent inquiries in oracular language, "Why do you ask? They are from God!—there is nothing new: the air, the rain, and the sunshine have formed these rocks. The surface of to-day is formed of what is, the surface of yesterday was formed of what was. The winds and waters convey to burial to-day; they did the same yesterday. There was purity in the beginning there is impurity now; they have mixed, but they rise again: do you not see the sunshine, the rain, and the air? Be satisfied!"

"And this hot spring"? I asked.

"I have just told you!—understand! You eat and drink the sunshine, your blood is warm; the fish eats and drinks in the slow absorbing water, its blood is cold. The fish and you are of the earth, do you not return to it? Is she not a universal mother? This spring is warm, that river is cold, nothing is forgotten!" The old man stepped into his bubbling cistern, creeping close to his venerated cow's mouth, sculptured in basalt, to warm his shrivelled limbs in the offspring of the sunshine and the rain. We recorded his concentrated thought.

Wandering by the banks of Indian rivers, tempting the fish with the yellow fly, or stopping to examine the basaltic boulders strewed around, thick as apples on the orchard grass after a September storm, the old question arose, Where did the basalt come from?

These water-worn boulders were very hard, but they were scratched or striated, and scooped out into great caldrons by the friction of sand and gravel washing round and round by water forces in their surface hollows. In quiet corners and on river beaches we found collections of fine black lustrous sand, remnants of the triturated boulders or of the basaltic river bed: these sand heaps were collected and carried off to the city of Bhoranpoor for the manufacture of glass bangles. This finely comminuted and well-washed sand could be carried 20 miles, and converted into glass at less expense and less waste than the unbroken, unwashed, impure basaltic rock found on the spot.

We now knew that basalt was of the earth, the air, the water, and the sunshine. It could not have been without the three latter; it contained earthy matter that could be washed out by the water, or burnt out by the fire.

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We thought of those early days when the first grasses grew on the first dry lands, when the spirit of God brooding on the waters stirred up their lowest depths, not so deep then as now, forming from its pure silicious foundations a brighter mud than is formed to-day, and mixing these materials with the impurities of the first growths. We had read a dark link in nature's chain stretching in one unbroken line from the present, through the past, into the sunshine of the early earth.

"From nature's chain whatever link we strike,
Tenth or ten thousandth, breaks the chain alike."

No link was missing, the pure silicious matter of the Azoic had mingled with the impure burials of the Palæozoic epoch; materials so digested, so illegible, that the link could only be read by the context. These materials could be again eliminated from the purer matter by water or by fire. By the latter the silicious material could be converted into glass or lava, its earthy materials into ashes, and its water into vapour.* By the former, the earth and water could be converted into mud, and the silicious material could be left as sand. It is allowed that basaltic formations were once in plastic conditions. If some of the constituents are lost sight of under the action of fire, we cannot allow that the plasticity was derived from a fused condition; but as the constituents are not lost sight of by the water process, we may assume that the plastic condition of the basaltic formations was as mud. We had the evidence of our own poor body to show the wondrous alteration made by the chemical laws of nature in what we eat and drink; we know that the earth beneath our feet was composed, possibly of some ashes, certainly all of its own dust, multiplied and changed many times over by vegetation and life. We imagined that the contributions from the vegetable and animal kingdoms were not always so plentiful or varied as at present, and we gave nature the credit of carrying on God's "rule of law," in the dust returned to her, as it was carried on in the dust lent to organisms, for their moments, their days, their years,

* We have several times alluded to the fact that basalt, as we find it, contains in its constitution several substances that are lost to its products in a molten condition. The accompanying Table* may be referred to on each occasion. The first column shows a late analysis of a certain basaltic rock; the second shows the contents of portions of that rock. We do not mean to assert by this Table that glass, slag, or lava, is formed from the rocks of the three first columns, but their analogies have been noticed before, and now we use them to exhibit discrepancies. These tend to prove that basaltic rocks, as we find them, could not have had their origin in fire. It is strange to read the arguments of learned men regarding the supposed recovery of lost substances by the basaltic rock after its imaginary molten birth. As they never could have been in a molten condition, these arguments may now cease, and we shall not again see a sentence like the following, that was once penned for our own instruction:—"Basalts like those of the Giant's Causeway cannot be distinguished from those of unquestionable volcanic action."—*Forbes' Athenæum*, No. 2155. We ask, Where are they?

TABLE OF THE CONSTITUENTS OF BASALTIC ROCKS; SHOWING WHAT CONSTITUENTS THEY LOSE BY BEING MELTED.

Minerals in Rossberg Basalt. — Dr. Petersen, —*Geo. Mag.*, No. 117.	Analysis of Hydro-tachylyte and Tachylyte.	Rowley Rag Basalt. — *Athenæum*, No. 2153.	Glass. — Kane.	Plate Glass. — Dumas — *Athenæum*, No. 2155.	Blast Furnace Slag. — *Athenæum*, No. 2155.	Lava. — Silvester — *Athenæum*, No. 2153.	Lava. — *Athenæum*, No. 2155.	Absent from original rock before melting, or lost in that process.	REMARKS.
Augite ...	Silica	Silica	Silicic acid	Silica	Silica	Silica	Silica.		
Olivine ...	Lime	Lime	Lime	Lime	Lime	Lime	Lime	Olivine ...	This is a product of leaves and bark of trees, from Salicine.—*Kane.*
Nepheline	Alumina	Alumina	Alumina	Alumina	Alumina	Alumina	Alumina	Nepheline	
Titaniferous Magnetite	Magnesia	Magnesia	Magnesia	...	Magnesia	Magnesia	Magnesia	Titaniferous Magnetite	
Apatite ...	Ferric Oxide	Protoxide of Iron	...	...	...	Protoxide of Iron	...	Apatite ... Ferric Oxide	A phosphate of lime, or an earthy material of bones. —*Kane* and *Page.*
A Plagioclastic Felspar	Ferrous Oxide	Sesquioxide of iron	Oxide of Iron	...	Oxide of Iron	...	...	Ferrous Oxide	
Leucite ...	Potash ...	Potash ...	Potash			Potash		Sesquioxide of iron	
Mica	Soda	Soda	Soda			Soda	Alkalis ...	Felspar Leucite	Partly convertible into the silica or lime.
Melitite ...	Water ...	Water ...	...			† Water		Mica Melitite	
Hauyne or Nosean	Phosphoric Acid	Phosphoric Acid	...	Alkalis ..	Alkalis ...			Phosphoric Acid	The vegetable or animal constituents of rocks, when melted, would vanish in vapour, or resolve into ashes; while the metallic would naturally sink below the lighter lava and be lost, to the product of melting.
* Osteolite	Titanic Acid	Titanic Acid	...					Titanic Acid	
* Zeolitic Minerals	Manganous oxide	...	Oxide of Manganese					Manganous oxide	
...	Chlorine	...	Oxide of Lead	...	Other bases	...	Oxide of Iron	Hauyne or Nosean	
...	Fluorine	...	...	...	...	...	...	‡ Osteolite ‡ Zeolitic Minerals	Osteolite is from phosphorous existing in all animals and in a few vegetables.

* Products of decomposition. † It is quite possible that this water was absorbed by the lava after ejection. ‡ Products of decomposition.

As no two basalts could give the same analysis, so no two molten products could be similar. This Table shows that the formation of basalt is not due only to the Azoic epoch.—*H. P. Malet.*

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and their centuries. As we read the changes in our own body by the context, we used that for reading the rock. We saw a grand sign-post on ocean's highway pointing with a sure finger to silicious and earthy mixtures, once held in solution, settling down as mud, and forming into the basaltic rock.

However easy it was to come to this conclusion, in the self-confidence of youth, with all nature fresh, fair, and unsophisticated before us, we are puzzled in our old age by the many sign-posts erected at every turning, all pointing to new paths for the same goal; set up, painted, and inscribed by men as confident in their local knowledge as we once were; each one pointing to the only direct road for the formation of basaltic mass and mountain height. The directions are clear and explicit, but all differ; they cannot all be right; there must be something mental and philosophic somewhere. We propose to walk into a few of these paths, with the hope of finding out the true origin of basalt. We look at the fair pictures by old Italian masters, we see a hundred St. Sebastians, we count thirty-seven holy families in one gallery; they are all ideal; none of the painters saw the holy family, or the saint: they were all philosophers. We lately remarked to a noted sculptor, that he must have had a charming model for a statue. "We improve on our models," was his reply. Are all the finger posts before us improvements on nature's direction? are they mental pictures of basaltic origin and igneous causes?

The chameleon occurs to us here :—

> "When next you talk of what you view,
> Think others see as well as you."

So, without replying to that question, we place a few pictures before our readers, promising an acceptance of their decision if they can prove that any one is right. The galleries before us are very extensive, the pictures and the sign-posts very elaborate, very interesting. We cannot remark on all, we cannot do full justice to any, we only propose to notice a few pictures, which have reference to our subject.

About the time that we were observing basalt in India, 1831 to 1839, Charles Darwin was sailing round the world in the 'Beagle,' preparing his *Naturalist's Voyage*, his picture of molten rock mountain formation comes first on the list—

(No. 1.) "I believe that the solid axis of the mountain differs in its manner of formation from a volcanic hill only in the molten stone having been repeatedly injected, instead of having been repeatedly ejected."—*Darwin.*

The frequent injections were suggested by a desire to keep the earth in order, for the next picture shows—

(No. 2.) "If the strata had been thrown into their present highly inclined, vertical, and even inverted positions by a single blow, the very bowels of the earth would have gushed out."—*Ibid.*

We can only remark in passing, that if molten stone can be kept in conical, peaked, or in chain-like form, the gushing bowels might have assumed the same shapes; our mountains might have been larger than they are; we might have been freed from all anxiety as to more molten matter, but the precession of the equinoxes might have brought us into trouble. The next sketch shows that—

(No. 3.) "The Himalayas disturbed and bore up with them, in their upheaval, vast beds of the oolitic system. Belemnites and ammonites have been dug out of their sides along the line of perpetual snow, 17,000 feet above the level of the sea."—*Hugh Miller.*

This upheaval of a million of square miles by an unknown force did not seem so dangerous to Miller as the injection did to Darwin. We shall have something to say on its probability presently. We now enter a small, rich, introductory cabinet of geological subjects by Mr. Page, where we find that—

(No. 4.) "Basalt is of igneous origin, essentially composed of augite and felspar, with admixtures of hypersthene, hornblende, &c."—*Page.*

Mr. Page does not tell us how the constituents united, or how perishable and convertible materials endured the igneous origin. As his book is much used in schools, it might be as well to add a footnote in the next edition, for the benefit of this inquiring generation.

We now step into a series of rooms called the *Geological Magazine;* in No. 114 we are introduced to mountains—

(No. 5.) "Forms of beauty, grace, and grandeur, which impress themselves in varying degrees of intensity upon our senses."—*H. Woodward.*

This is a frontispiece to a very beautiful portfolio, which we shall have occasion to return to occasionally; at present, we select from its pages certain sketches—

(No. 6.) "Deposits, 40,000 feet in thickness."—*J. Hall.*

All of which can be elevated by

(No. 7.) "The theory of aqueo-igneous fusion of deeply buried sediments."—*Le Comte.*

If the heat is created by the buried matter there would be some truth in this picture, but this truth is disguised by the next—

(No. 8.) "At the depth of 40,000 feet, at an increase of 'about 90° per mile,' a temperature of 'nearly 800° Fahr.' would be found sufficient 'to produce aqueo-igneous fusion.'"—*H. Woodward.*

A certain depth for heat, and a certain heat for melting rocks have been long desired data, but we are thrown into confusion again by the next sketch—

(No. 9.) "A small quantity of alkali in the included water of such sediments would melt rock at lower temperatures."—*Ibid.*

There is much truth in this, but the measure of depth is utterly lost, because alkali may be on or close to the surface. This sketch (No. 9) will be looked at again, but we walk on to another—

(No. 10.) "It is 'by no means impossible that in some cases the granite may be squeezed out as a pasty mass through a rupture at the top of the swelling mass of strata.'"—*Le Comte.*

We do not recognise any necessity for the strata to swell, but there is no doubt that granite, as cold mud, has been squeezed out of its original position. We shall come to the explanation of the phenomenon by-and-bye. We now come to—

(No. 11.) "Such trivial modifications of elevation or depression as we see are, after all, only skin-deep; they are but wrinkles left by the hand of time on the still fair face of mother earth."—*H. Woodward.*

This is natural, and pretty; wrinkles are left by the sinking of soft, and the apparent elevation of harder matter; but as if we were hunting an igno-fatuus,

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instead of an aqueo-igneous, Mr. Woodward warns us not to accept an idea, that has been "ably advocated" in England and America in pictures,

(No. 14.) "Of a slowly progressive subsidence over areas of accumulation occasioned by the weight of the slowly and successively accumulated sediments."—*Dana, Silliman, Ricketts.*

If this subsiding had been true, then

(No. 15.) "'The solid mass of the Himalayas,' occupying some million of square miles, must have sunk into the 'yielding crust beneath.'"—*H. Woodward.*

It would have been unfortunate if these grand wrinkles had vanished from our mother's brow, but we all know that there are soft and hard foundations. The Himalayas have the latter, but in volcanic regions, where there are several actions at work to undermine the strata, the mountains do subside, as they have done in the Andes and other places. Under a universal law it seems that old people and old worlds must have wrinkles; they seem to come quicker in both cases, where the fiercest fires burn, but quickest of all where fire and water combine to ruin the foundation—

(No. 16.) "Passing on to *Geological Magazine*, No. 109, we find a picture of blocky rock surfaces formed by erupted volcanic masses, as 'the basaltic hills of the Siebengerbirg,' by shrinkage during consolidation, from a more or less pasty magma,' after 'a state of igno-aqueous liquefaction.'"—*Poulett Scrope.*

There is a great deal of nature in this picture, the *igno* being the only unnatural touch in it as the entire scene could be exhibited as an aqueous liquefaction. There is a difference of treatment of the same subject between M. Poulett Scrope, and Capt. F. W. Hutton. In *Geological Magazine*, No. 115, we find the latter defending his sketch—

(No. 17.) "The 'deposition theory' of mountain formation, or the removal of matter from one place to another by lateral pressure."—*F. W. Hutton.*

We must come to this squeezing process hereafter, but there are etchings before us that we must look at. In *Geo. Mag.*, No. 116, the Rev. O. Fisher exhibits

(No. 18.) "'Damped paper stretched on a board,' as an excellent illustration of mountains."

Perhaps there is more truth in this than we can at present explain, but the artist gives us another illustration—

(No. 19.) "So long as the tracts of the earth's surface, which we compare to brick coping, are not too large in comparison to their thickness, and of sufficient homogeneity and rigidity to be fairly represented by a course of bricks laid edgeways."

This gentleman says, "I should much like to see a diagram showing a range of mountains formed on Capt. Hutton's theory." So should we; but, by the diagram furnished by himself, we do not understand how it is that our engineers have never yet hit off one of the tunnels that nature has left through the mountains, if the bricks on edge are correct likenesses of their formation. Mr. Fisher raises his mountains by pressure, in No. 115. Capt. Hutton says

(No. 20.) "Those areas should never rise at all."

We really think that mountains may be as liable to rise on Mr. Fisher's system as they are to be pushed aside by the system of Capt. Hutton. These various theories all contain some truth in them, which we hope to elucidate presently.

Keeping some of Mr. Woodward's rooms for our return, we now step into the Treasury called *Principles of Geology*, by Sir Charles Lyell, 2nd edition, 1872. The first picture is

(No. 21.) "The basalts of Hesse are of igneous origin."—*Raspe*, vol. 1, p. 70.

(No. 22.) "The trap rock in the Vincentin analagous to volcanic products, and distinctly referable to ancient submarine eruptions."—*Arduino.*

Desmarest, Fortis, and others had

(No. 23.) "Established the relations of basaltic currents to lavas."

(No. 24.) Showed how "streams of basalt had poured out from craters, which still remain in a perfect state."—*Faujas.*

With so many verdicts in favour of fire, we do not wonder that the origin of basalt is assigned to fire. There are relations between basaltic currents and lavas. We know that lavas may be produced from, and consequently must be related to basalt: basalt therefore existed before its lava. As a thing of itself, its origin from fire is by no means proved, and it is curious that none of these artists perceived that mud torrents could be ejected from volcanos as easy as water, and that these muds when dry should be basalt. Looking to the opposite side of the room, we find a picture—

(No. 25.) "The Basalts of Hesse, and all other rocks of the same family in other countries are merely chemical precipitates from water."—*Werner.*

We are now in the arena, where Pluto and Vulcan became so celebrated a few years ago, till the latter claimed a victory. However, here is another noted picture—

(No. 26.) "In the primeval ages of the world there were no volcanos."—*Ibid.*

Sir Charles Lyell gives these pictures a place in his gallery, but condemns Werner for overturning a true theory, pointing out in a lively sketch, that—

(No. 27.) "The substitute was one of the most unphilosophical that can well be imagined."

There is more irritation in these words, than the occasion justified; perhaps it did not strike Sir Charles that true pictures cannot be so philosophical as mental ones. We now open a portfolio by a very noted artist, the frontispiece is—

(No. 28.) "The ruins of an older world."—*Hutton.*

followed by

(No. 29.) "Basalt and many other trap rocks were of igneous origin."

Their different aspect from that of ordinary lava was

(No. 30.) "Attributed to their having cooled down under the sea."

To which is appended an experimental design showing

(No. 31.) "The crystalline arrangement and texture assumed by melted matter cooled under high pressure."—*Sir James Hall.*

On which we remark, that no experiment by man is a proof of what nature can do, the result showing only that silex was present in the mass experimented on. The Professor did not feel quite satisfied himself as to some points of his igneous theory, so he wan-

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dered to the Grampian Hills to seek for evidence in its favour. He soon found all he wanted, so he sketched

(No. 32.) "Veins of red granite branching out from the principal mass, and traversing the black micacious schist and primary limestone."—*Hutton.*

(No. 33.) The alteration of the limestone in contact was very analogous to that produced by trap veins or calcareous strata."—*Ibid.*

He called these

(No. 34.) "The most clear and unequivocal proofs in support of his views."—*Ibid.*

"And," says Sir Charles, "this verification of his theory filled him with delight." The Professor was unable to fit his fire theory into the formation of the primary schists, so he painted them as—

(No. 35.) "Sedimentary rocks altered by heat, and originated in some other form from the waste of previously existing worlds."

We have nothing more philosophic before us than this portfolio. The old worlds, the granite veins, the alteration of calcareous rock by a supposed igneous action, are all mental pictures; cold silicious percolations may make the alterations; veins of heavy muds may run into softer. Hutton's discoveries may have been made in the same way. His fire is imaginary; and we have no occasion to seek in previously existing worlds an explanation of the phenomena, we are incapable of comprehending in this. We are not geologist enough to be fettered by Hutton's dogma, and say that "we are in no way concerned about questions as to the origin of things." We do not wish to be antagonistic or a friend to either theory, but we do wish to discover the truth; and while we try to avoid the caution of the present school, which prevents their acceptation of things before their eyes, we will endeavour to steer clear of that rashness which has led so many geologists into the

(No. 36.) "Internal deep-seated source of heat, with which we are but little acquainted."—*Page.*

as well as into "speculations as to the interior of the globe, concerning which we can know nothing by actual observation."

Stepping back through some side rooms, where the curtains are partly drawn, we find in *The Interior of the Earth*, published in 1870, a copy of a picture by Durocher, and some originals—

(No. 37.) "Whatever be the reason, it is certain that the basic rocks, whose eruption took place during primary geological periods, were formed merely by accident, as compared with the immense development of the silicious and felspathic masses."

This geologist perceived that the silicious rocks, of which basalt is one, were not erupted rocks, so we look at some originals.

(No. 38.) Neither granite or basalt in their original state were formed by fire."—*H. P. Malet.*

The next picture explains the subject more fully, and opens up a wide field of suggestions—

(No. 39.) "What has fire done upon earth? Fire has only destroyed and reconstructed. Nothing has found an origin in fire. Fire itself is an effect, and not a cause; it is in the atmosphere, it is in the flint of the earth, it is in the water—in each it is a thing by itself, unseen or unfelt; certain conditions bring it into active existence."—*H. P. Malet.*

Passing on, we come to the latest pictures on the subject by the most accurate, and most careful calculator of the time, though some of his studies from nature seem to us to be wanting in truth; the views we look at are drawn to meet certain objections, made by Mr. Poulett Scrope, to the grand design of volcanic energy by Mr. Robert Mallet.

(No. 40.) "If I have appeared to underrate the views of geologists as to the nature and origin of volcanic heat, it is because I believe them to be wholly untenable by the light of existing science."—*R. Mallet, Geological Magazine*, No. 117.

The views alluded to are the seas and lakes of molten lava kept in the earth's interior. We have seen, in picture No. 9, how Mr. H. Woodward left an escape for himself out of the fire world, and now he hopes to get Mr. Poulett Scrope out of the burning by noting on the sketch of R. Mallet, that Mr. Scrope has doubted the internal fluidity of the earth, and the access of water to that molten matter for some years past. We do not doubt but that Mr. Scrope is as anxious to get out of hot water as Mr. Woodward is; but we refer both of them to the picture No. 16, while we find that Mr. R. Mallet, in *Geological Magazine*, No. 118, tells the Editor that his footnote does not seem "justified by facts." This molten interior on which so much depends, and on which most of the pictures selected by us are founded, seems to be a much more dangerous plaything than has been generally imagined. Here is its picture—

(No 41.) "The flood of heat poured forth from such an incandescent nucleus through such a thin skin. . . . would be such as to roast every organized being off the present face of our earth. Yet this gigantic incandescent nucleus and parenchymatous surface-skin Mr. Scrope and the school to which he belongs, must have, or their theories are impossible."—*R. Mallet.*

Mr. R. Mallet has very considerately supposed that we are 200 or 300 miles from the heated centre. We hope he is nearer the truth than picture No. 8 leads us to imagine.

We gladly step into the cool garden to think over these varied pictures of the same originals. Volcanic energy, molten mountains, melted basalt, mud basalts, other worlds, and sedimentary schists, flit before us in intangible conditions, like mock moons, or dancing reflections of the hazy sun. We cannot for a moment allow that any mass of rock, holding in its composition materials that are convertible by heat into other conditions, could have originated by fire.* By denying this origin to basalt, the question of its origin expands itself. If basalt and the old silicious schists are water sediments, No. 35, or precipitates, No. 25, how were the solutions formed that left these deposits? We cannot draw lines too fine, a microscopical line of to-day may grow large by to-morrow. Nature is composed of fine distinctions, shown nowhere more clearly than in the perpetual changes in the character of her volcanic ejections.

Lava is formed from the indestructible base of the rocks that furnish it. Lava is of varied qualities, consequently the rocks that give it must be formed of

* See note, p. 189.

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varied materials. Looking back on the cosmical supplies of matter, we come to a time when they were not so plentiful or so varied as they now are. The area of land was not so extensive; the waters were more extensive, but not so deep; all the productions of either element were liable to greater trituration, and more complete defacement than at present; the winds were more unbridled, the waters were more uncurbed, organisms were fewer, therefore fewer were preserved in recognisable conditions. As the greater part of present growths return to undistinguishable dust, so they must have done at all times; as these dusts are now left alone, or carried away, arranged, and buried by wind and water, so were the dusts of old. Under the unavoidable law of nature, we thus fall in with the origin of Hutton's sedimentary schists, and Werner's precipitates from water, as ordinary formations from the dusts and muds of primary matter, mixing with the dusts and muds from the early growths of this world, all of the materials in unrecognizable conditions, all altered from what they were, all beautifully preserved in a magnificent mausoleum, but all liable to be again converted into muds and dusts, for new constructions by water; or, if acted on by fire, to separate and fall to pieces, converted, in their perishable atoms, into vapour and ashes, while the unperishable silicious atoms may melt into the analogies of glass, lava, or slag.*

We were once rebuked by a nameless critic for venturing to place before the world certain geological facts without quoting authorities. The critic was right: our word was of no value; our eyes had been of no use; no one would believe anything new of geology. We are endeavouring to avoid this impertinence now by quoting from all current authorities, and making natural deductions from their texts. We shall break no law of nature in so doing; but it is very likely that the nameless critic may be ignorant of the law, and still find occasion to dispute our truths. We will not quarrel with him if he does; but we say here that the most searching inquiry is what we most desire, feeling certain that if we have not declared the whole truth, we have declared nothing but the truth, and opened a door for others to find the whole.

While thus dreaming on, we reach an open, dome-covered building; its ceiling was beautifully painted: mountain and valley, rivers and lakes, wide plains, and a wider sea filled the roof; there was no horizon; water, earth, and their vapours mingled with the haze of heaven till it cleared off into the blue vault of the zenith. The interminable space was to us a type of the immeasurable past. Men have tried to fathom that without success; we do not attempt it, but we find on a basaltic slab an exquisite leaf of *Owen's Palæontology*, leading us to an authentic knowledge of ancient life, and showing

"That from the inconceivably remote period of the deposition of the Cambrian rocks, the earth has been vivified by the sun's light and heat, has been fertilised by refreshing showers, and washed by tidal waves; that the ocean was not only moved in orderly oscillations, regulated, as now, by the sun and moon, but was rippled and agitated by winds and storms; that the atmosphere, besides these movements, was healthily influenced by clouds and vapours, rising, condensing, and falling in ceaseless circulation. With such conditions of life palæontology demonstrates that life has been enjoyed during the same countless thousands of years; and that with life, from the beginning, there has been death."—*Owen*.

We are told by Page that the Laurentian, and Cambrian systems are "the lowest fossiliferous formations yet discovered in the crust of the earth." No one supposes that amidst these remains we have discovered fossils of the first creations. Life came by slow degrees, it increased, and multiplied; the first-born are recorded as dust, mixed up in the illegible rocks of these systems; while in and below them must be the equally undistinguishable remains of the vegetations prepared for the maintenance of the first lives. As the dusts of these vegetations must have been as liable to ignite, to expand, to give out their vapours, to leave their ashes, and to separate from their silicious masses, as the dusts are now, how is it, that though reposing on the very confines of the supposed flaming interior, their silicious portions were not converted into lava, or into the supposed igneous rocks—basalt, trap, and all their varieties?

Leaving this question unanswered, we will briefly follow Mr. Page through the systems of this earth, as arranged by him, and accepted by our schools, with the intention of finding out where certain igneous action is proved by the results.

Systems by Page.

Metamorphic.—The lowest stratified system of the Azoic or lifeless epoch is called the metamorphic; in it are "gneissic, and granitoid schists"—composed of "felspar, quartz, mica, talc, hornblende, and chlorite—these ingredients having been originally deposited as silts, and muds and sands."

Laurentian contains crystalline schists, quartzites, and serpentinous limestones.

Cambrian contains semi-crystalline slates and schists.

Silurian contains shales and limestones, grits and flags.

Old Red Sandstone.—Yellow, and red sandstones, and conglomerates. In these two systems supposed igneous rocks appear as "overspreading or molten lava," or as "scoriæ and ashes," also as "upheaving or disrupting masses, cut through by dykes of greenstone, felspar, and porphyry, seemingly indicating a cessation of volcanic action, during the main deposition of the old red sandstone, but a period of great activity and disturbance, both at its commencement and its close."

Carboniferous shows "ample evidence of igneous activity," traps and basalts are plentiful, "upheavals and convulsions" numerous.

Permian has "dykes and outbursts of basalt, which seem to be connected with igneous centres situated in the older systems."

Triassic exhibits similar conditions.

Oolitic shows gentle "outbursts of trap" and dykes of greenstone.

Cretaceous has no igneous rocks in England; but the basaltic traps of the Giant's Causeway in Ireland are supposed proofs of igneous action there.

Tertiary.—All the igneous rocks of this system are of "true volcanic origin . . . . with the exception of a few doubtful cases."

Post Tertiary, including the present, gives us plenty of volcanic action producing lava, as the melted matter issuing from granitic or basaltic rocks. Neither

* See note, p. 189.

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of these rocks are now reproduced by igneous action in their normal condition.

According to these arrangements of science, we have evidence of igneous action in the two upper systems, down to the Silurian, but none in the systems below that. On this *prima facie* evidence, we answer that the silicious masses at the bottom of the stratified systems were not converted into lava, because there was no fire below them. As this answer coincides with the laws of nature, we leave it for a moment to consider another point connected with the basaltic rocks as we generally find them. Mr. David Forbes told us in the *Athenæum* of 13th February, 1869, that one lava is strikingly analagous to the old granites in chemical composition, and the other "nearly, if not quite, identical with the basalts." Also that portions of a mass of Rowley Rag Stone that he melted, when cooled, "could not, even upon minute inspection, be distinguished from the original basaltic rock." We take these facts as direct evidence that basalt existed as a rock before the experiment or the analysis were made. We allow that nature can do what man does, but the conditions must be identical in both cases. To enable nature to turn a basaltic rock into a molten mass, and back again without alteration in its features, we must find the rock in strata without gas or water; the expansion of one, or the explosion of the other would necessarily destroy the identity of the experiment and its result. This condition could not be found.

We were told in No. 8 that 800° Fahrenheit might produce fusion of rocks, but *Kane's Chemistry* (p. 56) tells us that 1000 volumes of air expand to 23,125 at a heat of 660° Fahrenheit! We can say little about water at present. Kane tells us that according to the supposed progressive increase of heat, as we descend in the earth, water could not exist as a liquid at a depth of 2 miles (p. 105). Under no circumstances could Mr. Forbes, or those who have conducted similar experiments before him, place nature in a condition similar to themselves; the expansion of the buried and imprisoned gases would have converted rock and experimentalist into some other materials. One point is, however, gained by their labours. As the basaltic rock existed before it was melted, so it must exist before any basaltic lava is produced. The molten produce of any silicious material must be analogous to our varied glass, to the slag of our furnaces, to the vitreous productions of our kilns, to the glassy streams which ran from the decomposed granite pillars during the late fire at Boston, as told by an eye witness, and to the glass bangles produced from the basaltic sand at Bhoranpoor. These products lose some of the impurities of the material from which they issue; none of these impurities could be restored by fire; the rocks could not be reconverted into their normal condition under any action of natural combustion. So that there is *prima facie* evidence to show that the basalt rock, as we find it, full of its native impurities, never was in a fused condition.

H. P. MALET.

(To be continued.)

THE GERMAN AND AUSTRIAN ALPINE CLUBS will hold their Annual Meeting between the 27th and 30th of August, at Kempten.

DJETYSHAHR

(EASTERN TURKISTAN),

ITS SOVEREIGN, AND ITS SURROUNDINGS.

THE speculations which the newly-established Muhammadan State in Eastern Turkistan gives rise to, serve to intensify that interest in it which the treaty, lately so successfully negotiated by Mr. Forsyth, necessarily awakens in us as a commercial people. On the 2nd of February last, the Amîr Yakub-Khan of Kashgar affixed his seal and signature to a document which lays the foundation to a trade of great promise with a country hitherto completely isolated from the rest of the world. Nothing but the natural difficulties of the roads will now prevent the most free communication between India and Kashgar through Cashmere, political and fiscal barriers being entirely removed. In order to render Kashgar accessible from India by every southern route, it remains only for us to secure a right of way through the Affghan province of Badakhshan—a right of way which, in the interests of Affghanistan itself, will doubtless not be withheld from us by our friend and ally, the Amîr Shere-Ali-Khan. Indeed, it is fully time, for the advancement of that very trade in whose cause we have so boldly entered into diplomatic relations with the ruler of a country which was, ten years ago, a province of China, that we should begin to gather in Affghanistan the first fruits of a long series of heavy subsidies paid to its sovereign. We heard, not very long ago, that an influential Russian company of merchants and others were about to send a large caravan of Russian merchandise, by way of Khorassan, to Candahar and Cabul. Such a thing could surely not have been set on foot without the knowledge of the Amîr of Cabul; and most certainly the Russian company could not have undertaken the venture without receiving, through their Government, the sanction of the Amîr to enter into his territories. It is a well-known fact that no Russian caravan dare venture into a foreign country without the permission of the Russian Government; and to have received that is to have received the permission of the Sovereign of the State which is its destination. It were strange then, to say the least, if the markets of Affghanistan were thrown open to the sale of Russian merchandise before we secured so much as a right of transit for our own goods. We are by no means anxious to see the Russian merchant excluded from any field which might be thrown open to honourable competition; we have fought the giant monopoly in every corner of the world, and have, in his place, set up free trade—a twin sister of justice—for the benefit of all mankind; so that it were a betrayal of her cause even to throw impediments in the way of Russian trade, by whatever route it might be advancing, in Asia. None the less, however, should we feel aggrieved, if to us, who are his friends and allies, the Amîr should deny privileges which he accords to strangers. But it is also on other, more elevated, moral grounds that a high road of commerce should be opened through the eastern provinces of Affghanistan. These grounds are—the benefit which would accrue to trade, and the pacification and well-being of a country and people perpetually in a most odious state of revolution and anarchy, because of the political barriers which render them inaccessible to the civilizing influences of the

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Sketch Map
OF THE
FRONTIER DISTRICTS
OF
KASHGAR
AND
RUSSIA.
By E. G. Ravenstein.
Scale. 1:6.000.000.
Heights in Eng. feet.
SEMIPALATINSK
TOMSK
MONGOLIA
Kobdo
Sergiopal
Zaisan L.
Black Irtish
Kyzylkashki
Zaisanski
Urungur R.
Kyzyl-bashi
Chagan Obo
Bulantokhoi
Baga Nor
Chaghan L.
Naryn
Chashgan
L. Balkhash
Chuguchak
Emil
Churu
Alakul
Modzhartuk
Emil
Orkhochuku Mts.
Bolgun
Chagan Gol
Tili Nor
Chekdelik
Baitag
Kabtag
Sary-ishik Otrai
Arasanskaya
Lepsinskaya
Kopal
Kaptagai
Jair L.
5000
Olon bulak
Nam
Ili
Koksuiski
Kur-kara usu
Sairam Nor
Ebi Nor
(Kyzyl Tau)
Ching-ho
Eban Gesun Nor
Ayar Nor
Kurkara usu
Manas
Tsinshui
Fulan
Guchen
Khuitai Murui
Barkul
Chin-si-fu
Ili
Kulja
1760
Ak Durtem
Kara Tau
Ulu Ata Tau
15000
Vernoe
2320
Kastek
Kegen
Chapchal
5000
Ili kurgai
Kokgun
Chong yulduz
Shapa-arid
Urumtsi
Toksun
Turfan
Lemp
Pijan
Lukchak
Khamil
Hami
Khartube
Asartu
Shara Nor
Issyk Kul
4900
Santash P.
Sunbe
Tekes R.
Karakol
Tengri Khan
17000
Muzart P.
Muzarbashi
Bai
Saram
Kuchar
Toganai
Yangi Shahr
Kharashar
Kara kyzyt
Bostan Nor
Kurungle
Naryn
Uch
Aksu
Kalgali
Shah-Yaro
Baba Kul
Buguz Kunurga
Sairak
Yangi Aryk
Kaitu Gol
Tarim
Ergue
Lop Nor
Charwak
Kyzyl Su
R. Tarim
Maralbashi
Kok-kiya
Kashgar
Yangiabad
Yangi Shahr
Yarkand Daria
Khotan Darja
Yanghissar
Tashurq
Gashi L.
From Khotan
T. Yarkand
TARBAGATAI
DZUNGARIA
CHINA
KHUSUTAI
TSAIDAM
TENGRI TAGH
TURFAN
KARA KHOTAN
KASHGARIA
KHOTAN
Sary-ishik Otrai
Ili Tau
Kara Tau
Ulu Ata Tau
Kurgy Ala Tau
Issyk Kul
Terskey Ala Tau
Kok Shaal Tau
Alexandrowsky Ridge
Tengri Tagh
Shah Shan
Kuruk Tagh
Altyn Tagh
Kara Kuram
Kuen Lun
Kara Kash R.
Yurung Kash R.
Yarkand R.
Khotan R.
Kara Kash
Yurung Kash
Yarkand
Khotan
Aksu
Kashgar
Yangi Shahr
Yanghissar
Kok-kiya
Maralbashi
Yangiabad
Charwak
Kyzyl Su
Buguz Kunurga
Sairak
Yangi Aryk
Shah-Yaro
Aksu
Kalgali
Uch
Naryn
Kuchar
Saram
Bai
Toganai
Yangi Shahr
Kharashar
Kara kyzyt
Bostan Nor
Kurungle
Lop Nor
Tashurq
Gashi L.
Tarim
Ergue
Kaitu Gol
Shah-Yaro
Baba Kul
Buguz Kunurga
Sairak
Yangi Aryk
Kyzyl Su
Maralbashi
Kok-kiya
Kashgar
Yangiabad
Yangi Shahr
Yanghissar
Yarkand Daria
Khotan Darja
From Khotan
T. Yarkand
Tsinshui
Fulan
Guchen
Khuitai Murui
Barkul
Chin-si-fu
Urumtsi
Toksun
Turfan
Lemp
Pijan
Lukchak
Khamil
Hami
Khartube
Asartu
Shara Nor
Boro-tsu
Dentsan
Kara kyzyt
Bostan Nor
Kharashar
Kurungle
Toksun
Fulan
Tsinshui
Guchen
Barkul
Chin-si-fu
Khamil
Hami
Khartube
Asartu
Shara Nor
Lemp
Pijan
Lukchak
Turfan
Urumtsi

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outside world. Time, stimulated and controlled by opportunity—even as the Muhammadan's *Kismet*, whatever he may say to the contrary, is moulded by himself—will doubtless effect all this; in the meanwhile we must hail, as a happy augury of the future, the foundations so happily laid for commercial relations with Kashgar, hoping that there, as elsewhere, the broad wedge of international commercial relations, by opening a wide cleft for fair and open rivalry in trade, will cause that smaller envenomed one, which but makes a split, to fall to the ground. On the prospects of a trade with Kashgar, and on the routes from India, we would refer our readers to Mr. Shaw's article in the *Ocean Highways* for August, 1872, and to the same Magazine for March, 1873.

The country whose independence has been recently recognised by two European powers—both equally bound by treaties with China—is, however, in an early nascent state as regards its political relations with the governments of those countries who have already recognised the sovereignty of its ruler. It may even be said that as yet Kashgar forms only the nucleus of a state standing over the still smouldering ashes of Chinese domination, for that domination still shadows forth hopes of rising again, phœnix-like, into existence in Eastern Turkistan, and in one direction, at least, there is as much indefiniteness as to its extent as there is in the tail of the present comet; while in another direction it simply loses itself in space. Now-a-days, with two such crushing, not to say all-absorbing powers in Asia as England and Russia, the inviolability of an intermediate smaller State must depend, perhaps, almost as much on its own power of resistance and natural bulwarks, as on the power of abstention from encroachment which its two trade-propelling neighbours may be able to exercise. We cannot, therefore, but feel very curious to know as much as we can learn, not alone about the markets of this country, but also of its military frontiers, and of that power to which, with Russia, we have lent the prestige which follows on our official relations with the sovereign. To this end we publish a small map with a delineation of the northern frontier from its extreme point in the west to as far east as the Amîr Yakub-Khan's territories are ever likely to extend. The western frontier may be said to be to all intents and purposes a wall of unscaled and unscaleable heights. It is to be understood that this is said merely in a metaphorical sense, for there are routes to Kashgar and Yarkand from Wakhan, Darwaz, and Kokand. Yet these may be said to be classical routes of bygone centuries, which have almost fallen into disuse since the cessation of the great movements of the various races of Asia, and their subsequent stagnation. Some time hence, however, the great powers of attraction of the West must produce a lively circulation through these arteries. The bulwarks on the south are composed of several parallel ranges of mountains and of wide, bleak spaces, which, while they render the country comparatively safe from invasion, offer difficulties to trade of a nature not more than sufficient to stimulate enterprise. From the south-west there is little danger of trouble or invasion, and the routes from Badakhshan, albeit one of them has become known to us through an agent of Mr. Forsyth, who pursued it on a journey from Kashgar to Cabul, are little frequented, and are, as yet, sealed to us.

Three weeks ago, the *Hour* published some highly interesting letters dated from Kashgar, written by Captain Biddulph, and in the July number of this Magazine there was a letter from that officer, and one from Colonel Gordon, which conveyed all the information which has, as yet, resulted from Mr. Forsyth's mission. This we can now supplement by a few observations on that northern line of frontier where the Amîr has been so diligently at work with his own hands since he first seized the reigns of government in the year 1865.

It strikes us as very strange that while we recognise Yakub's new title and dignity, styling him the Amîr Yakub-Khan, we have as yet not adopted any name for the country of which he is sovereign. We know that his sway extends to Turfan—nay, we have learned that he is even master of Khamil; we positively know that he has resided chiefly at Aksu, a large town and centre of a very large and important district, and yet the high contracting party to the treaty of Kashgar is acknowledged by us as the ruler of the territory of Kashgar and Yarkand alone. In the Persian duplicate of the treaty the Amîr is doubtless credited with a wider extent of dominion, and Kashgar and Yarkand are certainly meant to cover more territory than would be commonly inferred from names of only two cities,* with the outlying lands which they include, for we could not have involved ourselves in political relations with the sovereign unless we were assured that he held absolute and unmolested possession of the entire region known to us geographically as Eastern Turkistan. In the 14th or 15th century, under the Hodjas or spiritual Governors of Eastern Turkistan, descendants of Muhammad,† who established a ruling hierarchy, each Hodja ruling supreme in a separate town, the country was known as Altyshahr. This name has survived ages of Chinese domination. Altyshahr‡ means country of the *six* cities, including Kashgar, Yangi-hissar, Yarkand, Khotan, Aksu, and Úsh-Turfan. This name the Amîr Yakub-Khan has changed; having seized Turfan, or Kuné-Turfan,§ and thus

* Yarkand and Kashgar have been adopted in this comprehensive sense from the circumstance of the name of the first city—derived from *Yar* or *Er* = "territory," in the Turk tongue, and from *Kiang* = wide—signifying extensive country or territory. Peter the Great first heard of the abundance of gold sand in this place, which was then called Yar-Kian, *Er*ken or Er*ket*. According to Wells Williams, this city was called Yer *Kiang* by the Chinese; it was constituted their capital of the "Southern Circuit," and the Kiang was converted into the ordinary Kand or *Cand* by the Turks. This word or syllable always terminates with a *d* when the first vowel is *a*, as in this instance and in Samarcand; not so in Tashken*t* Chemken*t*. Kent is another form of the same word, meaning permanent habitation, village, &c., in use among the Kirghizes: thus Djan-*Kent*, the name of the ruins of a city called Yangi-Kent, by Abulfeda.

† For explanation of the origin of the Hodjas, see *Timkofski's Travels*, Note, p. 376, vol. i., where Hodja is written Khodjo; and see Burner's *Travels into Bokhara*, vol. ii., p. 227.

‡ "The divisions of Eastern Turkistan," which was the Chinese southern circuit, were regulated, in the time of the Chinese tenure of the country, by the position of the eight Muhammadan cities; these, as named in the Statistics of the Empire, were Harashar, Kuché, Ushi, Ohsu, Khoten, Yarkend, Cashgar, and Ying Keshar."—Wells Williams, vol. i. p. 178. But from the period of the first Hodjas, as said above, the name of Altyshahr was first adopted as including only the six western towns belonging to the Turk race of people, "over which the Chinese did not exercise any immediate influence in matters of Government."—*Michell's R. in C. A.*, p. 149, and see p. 124.

§ It was more probably after the seizure of Kara-shahr, that Yakub gave the name of Djetyshahr to his territories. Ush or

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added one more city to the *six*, he has called his dominions the country of the seven cities, or Djetyshahr, and this name might have been appropriately applied to it on the first occasion of our recognition of its independent status. The towns or groups of settlements of secondary importance in this country, walled in or otherwise, are, according to Valikhanof, Faizabad; Khan-Aryk, and Ustyn-Artysh in the Kashgar district; Laba and Terektek in the Yangi-Hissar district; Burchuk, Maral-Bashi, Ser-i-kul, Yangi-Churpak, Gumah, Sanchja, Kilyan, Kargalyk, Tagbui, Kakyar, and Yularyk in the Yarkand district; Ilchi, Karakash and Yurunkash in the Khotan district; and Bai, Sairam, Kum-Cash and Aikul in the Aksu district; Valikhanof enumerated forty-two towns and settlements, besides the six chief cities of Altyshahr, and if it may be considered that he gives very nearly the full number, we cannot be very far out of our reckoning if we put down the figure of the settled inhabitants of the country at something like 500,000 at the outside. These, according to Mr. Shaw, are of the Aryan race, excepting the Tungans and the Chinese of whom there are still some thousand in the country. We cannot arrive at any correct estimate of the nomad population owning allegiance to the Amir. Colonel Veniukof considers that Russia and Djetyshar conjointly own 850,000 of these nomads, of which number 710,000 fall to the share of the latter. This people are Dikokamenni, Kara or Black Kirghizes, otherwise called Buruts or Khilikizi by the Chinese who derive the latter name, not the origin of the tribes, from "forty maidens," written Kyrk Kyz.*

Besides all these there are some 50,000 Kalmuks, camping chiefly in the mountain valleys to the north of Karashahr.

With reference to the northern boundaries of Djetyshahr, as we will now call the territory under the government of the Amir Yakub-Khan, it is curious to observe that the Russians claim, under their treaty with China (Pekin, 1860), the entire range of the Thian-Shan Mountains. Upon this treaty they base their claim not alone to the Naryn River, but also to the southernmost slopes of that range of mountains. They have already asserted their right of possession even on the Chatyr-Kul Lake—against which the present sovereign of Djetyshahr has made unavailing protests. Strictly speaking, this Russian claim under the treaty in question, may well be disputed; for, in the first place, the treaty never came into operation, remaining as regards the Thian-Shan section of the Russo-Chinese frontier quite as much a dead letter as did the protocol of Chuguchak of 1864, with reference to the Tabagatai line of boundary. In the second place, it is simply laid down in the treaty that the Russo-Chinese frontier shall pass from the Tengritagh, as far as the limits of Kokand. What these limits were remained to be ascertained, and the commission which was to have been appointed to survey the proposed line of frontier, and to map the country, one copy of the map to be held by the Russian Government and the other by the Chinese, was never organised. The matter dropped entirely, but succeeding years brought succeeding revolutions. In 1862 Lieutenant Protsenko demolished the then vacant Kokand fort of Kurtka, and others, on the Naryn; and gradually and imperceptibly the Russians have constituted themselves the successors to the Chinese line in the Thian-Shan from Chatyr-Kul to the Muzart, and, as Colonel Veniukof expresses it—"to say the least, as far as the sources of the Kunges."

One of the objects, if not the main object of the special Russian mission to Kashgar in October 1868, was to sound Yakub-Khan on the subject of the treaty of Pekin, and to discover whether, and on what conditions, he would agree to a delimitation which would advance the Russian frontier over two mountain ranges to the south of the Naryn, and bring it to the foot of the third. It appears that Yakub-Khan "showed a perfect indifference for international obligations." He would not father upon himself obligations to be interpreted for him of a treaty entered into by Russia with a government whose power he had aided in subverting. He was "recalcitrant," "obstinate," and had even the audacity to lay claim to the left bank of the Naryn. And, indeed, his envoy stated in Calcutta that the Naryn formed the boundary. Of Captain Reinthal's mission to Kashgar apparently nothing was known, even in 1869, if we may judge by the correspondence between the British and Russian Governments for that year, which was published in 1873. Even in St. Petersburg, judging from the same parliamentary papers, the memory of it seems to have been obliterated until 1870, after Shaw's and Hayward's journeys to Kashgar and Yarkand, when an account of it was published in the military journal.

We may, however, come to the conclusion that Lieutenant Hayward heard of Captain Reinthal's mission, and of the purport of it, from the following sentence, which occurs at p. 98 of his narrative of his journey to Yarkand and Kashgar in the *Journal of the Royal Geographical Society* for 1870: "Now, however, overtures have already been made to the Atalik-Ghazi to carry out the terms of this treaty of 1861; but he has decidedly refused to entertain such views, and holds that he is not liable for the fulfilment of any treaty entered into with the Chinese." Lieutenant Hayward proceeds to say that Russia considers Yakub an usurper, adding in a note that she categorically declines to recognise him, considering Yarkand and Kashgar as still belonging to China. She would, then, we presume, have done so if the Atalik-Ghazi, as he was then styled, had agreed to carry out the terms of the treaty of Pekin; overtly, it is true, Russia did not recognise the Atalik, but she received his envoy, the Mirza-Shadi, in 1868, at St. Petersburg, and sent an envoy of her own to Kashgar to negotiate with the ruler *de facto* of Eastern Turkistan.

Each succeeding Russian map shows an alteration in the line of the Russian frontier southwards; the great feature in the direction of Djetyshahr is now the absorption of Chatyr-Kul Lake. On this point Colonel Gordon's letter, in our last number, will be read with much interest; but, as he seems to have been greatly surprised by, and doubtful of, the accuracy of the reference to Chatyr-Kul as being "on the borders of Russia and Eastern Turkistan," some explanation is needed of his statement, which runs thus: "From what we heard on the spot, we are inclined to believe that practically the Torugat Pass range is the boundary, *i.e.*, the southern spurs of the Thian-Shan." We are at a loss to know whether Colonel Gordon means that a

Ush-Turfan is not to be confounded with the place called simply Turfan, and known as Kuné-Turfan.

* *Russians in Central Asia*, J. & R. Michell, p. 92.

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Russian outpost is actually located on that pass during the summer, or, whether the Torugat Pass range is to be considered as limiting the Chatyr-Kul on the north. And yet by his own showing, and according to Fedchenko's map in the August number of *Ocean Highways* for 1873, the Torugat (there called Torugart) Pass is immediately south of Chatyr-Kul Lake.

We do not know the nature of the country lying between the Chatyr-Kul and the sources of the Aksai River, flowing through Aksu, but we may safely say that a footing on the Torugat or on the Chatyr-Kul is equivalent to a footing in the basin of the Tarim River, unless indeed Fedchenko's map requires correction in this direction, as would follow from Colonel Gordon's mention of the Naryn-Almaty road by way of the Terek Pass, lying east of Kashgar, in which case the sources of the Aksai may be found to be further separated from the basin of the Alpine Lake. Nevertheless, there is a road leading from the Arpa (probably the Ortagh mentioned in Davies's report) to the Chatyr-Kul, and from that lake into the valley of the Aksai; tracing it from the east, this is the road from the Zaùkù struck by another route from the Issyk-kul, west of Zaùkù, which we shall mention below.* We can close this part of our subject with a reference to Colonel Veniukof, who, writing in 1873, says: "South of the Issyk-kul the Russians have only one settlement—the Naryn fort—where there is a bridge across the river, and which is our most advanced post in the direction of the Kashgar territories." The Naryn-Almaty route appears to have been very jealously guarded by the Amîr Yakub-Khan, since his first accession to power. It seems, indeed, to have called his first attention after he had made himself master of Kashgar, Yarkand and Khotan. He aimed at diverting the traffic to the passes leading to Kuldja, so that it might be conducted, not through the Russian possessions, but farther east through the valley of the Tekes. The Russians seem quite as persistently to have endeavoured to frustrate him in this course, and ever since Valikhanof's journey across the Zaùkù to Kashgar, or later, since Reinthal's mission in 1868, they have paid particular attention to the routes from the eastern extremity of the Issyk-kul. While they have been labouring in clearing a road for wheeled carriages to the Naryn and beyond it—a work which has been thoroughly and admirably accomplished—they have done their utmost to encourage the despatch of caravans from Vernoë to Kashgar by the Zaùkù Pass.

On the Russian maps for the year 1871 the chief military station at the eastern extremity of the Issyk-kul was a place called Aksui, on a stream of that name. On the maps of the present day the very name of that place has disappeared, and Karakol, with a fort and a church, has appeared in its stead, nearer to the Zaùkù Pass.

To mention the routes leading from the north into Djetyshahr in their proper order from west to east, we must begin with the mountain track from Tokmak by Son-kul to the ruins of Kurtka Fort. Here there is no bridge across the Naryn, and the river is not always fordable. The road passes from the Naryn up the Aktala Rivulet, and either to the sources of the Arpa or to those of the Aksai—in the first instance over the Djaman-davan Pass, and in the second over the Bai Pass. Here we come out again on Chatyr-Kul: the distance from Tokmak is said to be 300 miles. The road from Vernoë across the Buam Pass is by far the best of all: as we have already observed it is now a carriage road, and has been used as such by a Russian officer, who, in 1873, drove all the way in a *tarantas* with the returning Kashgar Envoy from Tashkend. From the Buam Pass to Kashgar the distance is about 297 miles, from the Naryn 137 miles. A description of these two routes by Baron Osten-Sacken, with a map, will be found in the *Journal of the Royal Geographical Society* for 1870. The third route lies over the Kutemaldy Pass, at the north-western extremity of the Issyk-kul, and crossing three other passes, emerges on the Naryn Fort, from which there is a road leading over the Bogushty Pass across the Aksai Valley to the Terekty Pass, and so to Kashgar. This being shown to be the most direct and shortest road to Kashgar (140 miles from the Naryn), we must conclude that the last-named pass is not east of Kashgar, but north with an easting, as shown on Fedchenko's map. The fourth route leads from the Keregentash Pass east of the Ton (a southern tributary of the Issyk-kul), stretching north-east and south-west, first across the Little, then across the Great Naryn River, across the Karagai range to the sources of the At-bash, whence it passes over the Tus-asu Pass into the Aksai, and then by the Terekty Pass to Kashgar. This route, to the Naryn, was traversed by Captain Reinthal in November 1868, on his return from Kashgar. The road is somewhat difficult; the distance along it from the Issyk-kul to Kashgar is 213 miles. We have next Valikhanof's route from the Zaùkù—about 257 miles. From this point, on the Issyk-kul, there are roads to Ush, which are described by Humboldt and Ritter practicable for carriages from the Ishtyk and Bedel Rivers. Further east we find the route, or rather routes, for although not easy, but yet frequented, they are numerous, from the Tékés Valley to Aksu; these lie across the Kapkàk and Muzart Passes. The first lies to the west and the other to the east of the Muzart, which has been described from Colonel Shepelef's survey in the *Journal de St. Petersburg*, Nos. 186, 188, 193 for 1872.* It appears that Lieutenant Protsenko, who in 1862 and 1863 demolished several Kokand forts along the diagonal line of route south of the Issyk-kul, has surveyed most of the routes leading from the sources of the Tékés into Djetyshahr, but we have not seen any of his accounts. There is a MS. account by him under the title of *Routes into Kashgaria*, which we will look for in print in a year or two. We had almost forgotten to name the Djéparlé Pass west of the Zaùkù, mentioned by Valikhanof, of which the existence was some time ago repudiated by geographers. Farther east we come to several passes, more or less surveyed by Russian officers, of which the most important are those leading, on the one hand from the Koksu, a southern affluent of the Tékés, and on the other, from the Kunges, the eastern affluent of that river, into the Yuldus Valley, or basin of the Khoidugol or Kara-Shahr River.†

* It is, indeed, an ascertained fact that this line of route not only exists, but that it can be made available for wheeled carriages.

* *Vide* Mr. Vámbéry's digest of this in *Ocean Highways* for June 1873.

† See Valikhanof's *Alty-Shahr, Russians in Central Asia*, p. 120.

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It may be gathered from our description that to Yakub-Khan's diagonal line of route with vertical lines of outposts, the Russians on the north will also shortly have a diagonal line, with outposts pushed far into the mountains so as to command all the northern points of ingress into Djetyshahr. This Russian advance will necessarily produce complications with the nomads, on whom the Amîr mainly depends, as we are informed by Colonel Gordon, for the defence of his frontiers. Yakub-Khan, minus his Kara-Kirghizes, will present a less bold front than he now does; and it is the knowledge of this that shows him the necessity of fortifying his cities. The Kalmuks of the Yuldus, who entertain anti-Muhammadan sympathies, might prove to be unreliable coadjutors in the event of a Russian demonstration in the north-east.

According to the latest accounts, the Chinese have retaken Manass: Urumtsi is said to be held by the Tungans under pledge of good behaviour to the Amîr. Turfan is at present in the hands of the sovereign of Djetyshahr, but that place, as well as Urumtsi, stands on that ancient coveted line of route, which even long before Hwen-Thsang's time, served as the highway of trade from Western China to I'gou or Khamil; we, therefore, expect to see even Turfan shortly change hands in order that communication between Russia and China may be free and unmolested.

Arguing from a study of the periodical alterations of Russian maps, we may even presume that in due time, as a matter of course, the limit to the extension eastwards of the Amîr's sway and Muhammadan influence will be fixed for him at Karashahr. Looking, then, into the future, as we cannot avoid doing when we are on the topic of this progressing portion of the world, we may say here *Kismet* ends, and iron will intervenes: Karashahr, which is on the point of the horn of the Amîr Yakub-Khan's crescent-shaped territory, being also an extreme point of the great Arc of that Aurora Borealis whose cold, clear light illumines *Kismet's* gloom from the north, while the warmer southern rays penetrate its misty shadows from an opposite quarter.

The line of road from Khamil to Turfan and Urumtsi is the Chinese section of the Amîr's frontier; the condition of affairs here, according to certain rumours, is calculated to awaken misgivings and apprehensions. These rumours, which were at first vague, seem now to be gaining ground, and are certainly disquieting. We refer to the reported intention of the Chinese to reinstate themselves in Eastern Turkistan, and to restore the old frontier of their Empire. Sooner or later, at any sacrifice, they are said to have determined to do this. Their ultimate success is little doubted by competent judges of their power and perseverance. If these apprehensions prove correct, we shall then have to consider the prospects held out in the future in place of those relations of great promise which we have inaugurated with the treaty. But truly, the question of the succession to Yakub's sovereignty, which now looms in the future, pales before the importance of the reported determination of the Chinese to invade his territories.

ROBERT MICHELL.

IMPRESSIONS OF JAMAICA.

CHAPTER II.—KINGSTON.

THE Land of Streams—this being the literal Indian etymology of the name "Jamaica"—was in a less visible degree worthy its title at the time of my visit than it would be at other periods; inasmuch as most of the rivers were dry. Rain had not fallen for many weeks; nor, as the inhabitants very well knew, was it likely to fall for some weeks more. On the first or second evening of my arrival in Kingston, as I was sitting in the verandahed piazza of Blundle Hall, vainly endeavouring to cool myself with iced lemonade, I mistook the rustling of the foliage on the cocoa-nut trees of the court-yard for another sound, and said to my companions, "Hark, there's rain!" There was a sort of staccato accentuation in the noise of those big leaves, moved by the punctual land-breeze, that exactly counterfeited the patter of large drops on the dry earth, at least to the ear of a stranger; but when I uttered the word "rain," everybody around laughed and told me the thing could not possibly be. And in convincing me that I was mistaken, one of my Creole friends impressed me deeply with a grave and lasting veneration for a chronometrical climate, when he said, "There's no rain at this time of the year; we shan't have it for twenty-six days." I duly timed this Zadkiel of the Caribbees in my diary; and sure enough, on the 27th morning after he had prophesied, there was a mighty fall of waters, which, after some hours' continuance, was followed by a distant roar. I was staying at a sugar estate called Seven Plantations, in Clarendon, nearer the high lands, at the time I now parenthetically speak of, and a young lady of my host's family said, "There's the river coming down." Down it came, with a rush, that very hour; and what had been a bare torrid channel of stones and sand, over which I had ridden that morning, was, at night, a broad stream not easily fordable. Those dry river-beds, pretty wide near the sea, puzzled me greatly when I made the first of my coast journeys out of Kingston, eastward towards Morant Bay. Long before I left the island all such strange appearances had given place to the more agreeable visions of clear waters, winding through feathery groves of bamboo and guava-trees, and wizard shapes of old volcanic rocks, clad with palms and orchids, with aloes and the broad-leaved caladium, and with a thousand other different plants which none but an accomplished botanist could distinguish. The same exactitude which marks the dry and rainy seasons in Jamaica is diurnally noticeable in the sea-breeze of the morning and the land-breeze of the afternoon, both which are as regular in keeping time as, in English communities, are the postman and the baker who brings the rolls for breakfast. If that more necessary refreshment, the health-laden breeze that comes blowing from the sea when the sky begins to burn with cloudless heat, should happen to lag but a few minutes, you look at your watch and say, "Dear me, the wind is late this morning." From January or February until June this regularity is most remarkable; and for at least fifteen weeks from the beginning of the year I never knew the morning breeze from the south-east vary so much as ten minutes. We expected it at half-past nine, and at half-past nine it was nearly sure to come. It gradually increases until noon, when it is strongest, and then it dies away,

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ceasing entirely by five or at latest six o'clock. About eight in the evening is the time for the land-breeze, the influence of which extends 4 leagues or more off the coast. This breeze gains force until midnight, and then fades, being at an end by seven in the morning.

Wherever such regularity of climate is found, there will the disturbances be surely the most violent. No place in the world exemplifies the theory with more terrible force than does Jamaica, as we are historically reminded in passing Port Royal. I need not here recapitulate the many well-known facts of that terrible event, the great earthquake of 1692, which overthrew at once a city, arsenal, and fleet; which in a moment swallowed up 13,000 people; which caused infectious lakes to usurp the places of mountains, and which in altering the face of a country, altered, it has been said, the very climate. Along that wonderful line of coast, from Morant Lighthouse to the Palisades of Kingston, the evidences of enormous natural convulsions are plain. Nor are the same signs less frequent on the northern coast, which indeed abounds in volcanic traces, such as the vitrified lava called pumice-stone, which lies loose about the crater-like harbours of Lucea and Montego Bay. In the hurricane months of August, September, and October, it has happened within the observation of persons now living, that the water in those harbour-basins has suddenly disappeared, and, in less than a minute, has rushed in again. The connection of atmospheric with volcanic phenomena, though not clearly traced, may be inferred from their invariable coincidence. Where tremblings of the earth are so common that they excite no alarm, and very little comment, lightnings play incessantly in the night skies; and when rocks are rifted, and habitations overthrown, the sky is obscured, and thunder roars in fierce accord with the subterranean tumult.

In my first chapter of Jamaican impressions I spoke of that verbal change which adapts the service of the church to different conditions of existence. The variation I had then in mind was that of a sea voyage, when special forms of prayer are read. But far more impressive, because far more strange to my hearing, was that modification of the Litany which I heard for the first time when, the day after my landing, I entered the parish church of Kingston, which stands in the high part of the sloping town, and in a large, arid, sandy, stony, open square, called Central Park. Baptist and Wesleyan places of worship, also situate in this part of Kingston, are said to be much more numerously attended by the black population. Indeed, I had gone to the church remembering to have been told, or to have read somewhere, that the orthodox congregation did not, as in sectarian chapels, include any very large proportion of negro worshippers. My own observation strikingly confuted the statement. It is true I was a stranger, who had never before that time seen so many as a score of black people sitting together. But in order that I might not fall into any mistake by yielding to the mere effect of new appearances, I took pains to calculate the proportions of colour actually present, and found that they did not vary in any appreciable degree from the proportions which appear in the Census Returns of the population. In 1861 the numbers appeared thus:—whites, 13,816; brown or coloured people, 81,065; blacks, 346,374; total, 441,255. Many of the lighter-coloured among the brown population, however, had notoriously registered themselves as whites, and making no more than reasonable allowance for this harmless vanity, it is probable that the number of pure-blooded whites in the island of Jamaica did not then, and does not now, exceed, even if it reach, 10,000. There, in a church of old-fashioned rather than venerable aspect —it was built, I think, early in the 18th or late in the 17th century, and contains, among its most ancient monuments, the tomb of Admiral Benbow—sat a congregation as decorous, as attentive, and I will add as gaily and expensively dressed as any at the West End of London. On the whole, it was very like the church in which, as a small boy, I used to sit and long for one o'clock and the nursery dinner. The organ and the old responses sounded as they used to sound; the Rector, the Rev. Duncan Campbell, read and preached as I fancy I have heard other clergymen read and preach. But with this all familiar resemblance was completely at an end. Here, on the 21st day of January, my own birthday, in mid-winter, but with the thermometer at 83° in the shade, 5000 miles away from the friends with whom I had kept Christmas—here, with my sea-legs still inclining to sway under me when I stood up, and with my thoughts, alas! wandering far away from a devotional track when I knelt down—here I beheld a multitudinous flirtation of broad plantain fans, each fan fluttering against a jet black face. Every window was wide open, and tropical trees looked in and nodded at me, a stranger. But what was that which, as I have said, smote my ear with a strangeness greater than all? It was the prayer to be delivered by the Almighty Goodness "from hurricane and earthquake." The supplication occurred in the midst of those desires and petitions by which in England we seek Divine protection against lightning and tempest, plague, pestilence, famine, and other great calamities. From hurricane and earthquake the Jamaicans prayed most earnestly and most emphatically to be spared.

Before we landed at the Custom House Quay, our vessel had taken on board a Post-office Agent, who brought us news, it being then an anxious time. A phrase uttered casually by him, in a sort of apologetic detraction of the island, was, I afterwards found, rather usual among the inhabitants. When any Jamaican comments on a public act, or a state of public feeling, from which he himself mildly dissents, it is his habit to exclaim "Jamaica all over"! He says it in a pitying tone, distantly akin to love, perhaps, but bearing an ugly family likeness to contempt. It is, or was, "Jamaica all over" to live a little beyond one's income; to trust a good deal in Providence, a fertile soil, and what I have called a punctual climate; to neglect, waste, or misspend the natural riches which have been the envy of the world; to accept with resignation, or a sort of comfortable despair, the commercial bankruptcy which is almost regarded as the common lot. I am speaking of a period which, though recent, has been thrown into the background by a more hopeful state of things. Since Jamaica did the cleverest thing she had done for many a long yaer, and made herself a Crown colony, and since the Crown appreciatively recognized the compliment by sending her out a shrewd, energetic, cool-headed Governor, who left all his crochets, if he ever had any, behind him, she has been doing pretty well. But

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vital changes—the changes of healthy material and moral growth—are at least as slow as they are sure; and we must be careful about accepting for gospel everything we hear about Jamaica's new turn of prosperity. When I was there, I saw a great many fine estates, and especially coffee-plantations, "ruinate" or "in bush." I do not hear that all or any of these have been taken in hand by capitalists or men of enterprise and industry. One of the most magnificent of these estates, covered with coffee-plants, which were themselves covered, when I rode through the luxuriant desert, with bright red berries, doomed to rot season after season, is said to belong to Greenwich Hospital. So I was told; and though I "don't know how true it may be," I have rather better reason for believing than for discrediting the statement. It was asserted—and here again I repeat the story with reservation—that letters had been written to the authorities of the Hospital in England, on the subject of this neglected plantation, which is only a few hours' ride from Kingston, in the mountains; and that no reply had ever been returned to anxious inquiries. The conjecture most in favour among the merchants of Kingston was that some careful purpose of avoiding legal acknowledgment of liability, in case of any outstanding claim, induced the owners or trustees of the abandoned estate to preserve a discreet silence. The greater the altitude at which the coffee-berry grows in Jamaica, the better its quality and the higher its price. When dried in the natural way on the stone barbecue, the mountain-berry is of a bluish tint; and the colour is so much esteemed as an indication of superior flavour, that it has often been counterfeited with the artful aid of indigo. The estate of which I have spoken is very high; almost exactly on a level with the famous plantation belonging to Dr. Hamilton, which is 4000 feet above the level of the sea, and near the summit of St. Catherine's Peak. This gentleman's land produces the best coffee in the Antilles. I had the curiosity to gather a sample of the unclaimed fruit, and to have it properly dried and prepared. Want of cultivation had somewhat impoverished the berry; but it was yet pronounced by the best judges to excel the average growths of a lower plateau, and to resemble in character the coffee grown by Dr. Hamilton. I shall have occasion but too frequent as I proceed with the record of these my Jamaican impressions, to speak of the lamentable loss of natural productiveness, "for want of labour," say the merchants and planters, but also, I must venture candidly to add, for want of intelligent action among the "buckra" class.

Kingston, as most people know, is a very out-at-elbows place; a shabby-genteel city that has seen much better days. Dilapidated, some people call it; but, etymological pedantry apart, I cannot well recognize the fitness of the word; for not only, as a literal fact, do the ruins of Kingston consist of anything rather than stones which have been cast down; they seem to be the mere remains of a one-storeyed, wooden, slovenly-built city, that has fallen a slow prey to dry-rot and a quick prey, partially, to fire. Port Royal, tradition credibly informs us, was indeed a stately city, beautiful as it was wicked; and the same is said, no doubt with equal truth, of Spanish Town; but I doubt if Kingston, even at the height of its fortunes, was a place of very imposing appearance. It is well placed, and well planned, the streets being broad and at right angles, so as to afford a good current of air. The town is built on a sandy plain, having an inclination to the sea; and at six miles distance are the Liguanea Mountains, whose name you must take care to pronounce "Liganee," on pain of being misunderstood with the utmost severity. The law courts and other public buildings not connected with the legislature—for the seat of government, I need hardly remind my readers, has been hitherto at Spanish Town—are in Kingston; but they are such unpretending structures that you may be excused for passing them by without notice. Harbour-street, in its quaint irregularity, and freedom from pretence to any order of architecture, is rather picturesque; and it derives additional comeliness from a finely-grown guinep tree at the corner and from two or three date and palm-trees which are visible here and there. A strange peculiarity of Harbour-street is that each house or shop, for it is the street of retail trade in Kingston, has an independent covered pavement in front; and, inasmuch as scarcely any two pavements are on the same level, you must walk out in the sun and the sand of the roadway, for want of a continuous footpath, if you are bent on pedestrianism. Near the guinep tree, just out of Harbour-street, at the principal end, is Blundle Hall; and of Blundle Hall, its memories and associations, I have to speak anon.

GODFREY TURNER.

(To be continued.)

ARCHÆOLOGICAL SURVEY OF INDIA.

1874.

IMPORTANT DISCOVERIES AT BHARAHUT.

THE Archæological Survey of India is engaged upon the investigation of questions which often have special interest for the comparative geographer. During the working season of 1874 General Cunningham, and his assistant, Mr. Begler, explored the greater part of the Central Provinces, and made some discoveries of very great importance amongst the Buddhist remains at Bharahut.

On the northern frontier of the Central Provinces General Cunningham explored the small States of Mahiyar, (Myhere) and Nagod. In the former State there is an old temple, dedicated to Saraswati, on the top of a lofty conical hill, three miles to the west of the town. The enshrined figure of the goddess has an inscription of four lines on the pedestal, and outside there is a long inscription of thirty-nine lines, which is unfortunately much worn by the weather. It opens with an invocation to Saraswati.

In the State of Nagod, which was formerly called *Uchahara*, there are several ancient sites, one of which, named Dhaniya-Majgowa, has yielded a number of copper-plate inscriptions, of which eight are now in the possession of the Raja of Nagod. These records belong to two different families of petty chiefs, of whom the principal representatives are Raja *Hastina* and his sons Sakshabhâna and Sarvvanâtha in one line, and Raja Jayanâtha and his son Sarvvanâtha in the other line. At *Bhubhara*, 12 miles to the west-north-west of Uchahara, Gen. Cunningham obtained a short record of the last-named prince inscribed on a stone pillar.

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But the most interesting remains are at *Bharahut*, 6 miles to the north-east of Uchahara, 9 miles to the south-east of the Sutna railway-station, and 120 miles to the south-west of Allahabad. In our maps the place is called *Bharaod*, and General Cunningham believes that it may be identified with the *Bardaotis* of Ptolemy. It is the site of an old city, which only sixty years ago was covered with a dense jungle. In the midst of this jungle stood a large brick stupa, 68 feet in diameter, surrounded by a stone railing, 88 feet in diameter and 9 feet in height. The whole of the stupa has been carried away to build the houses of the present village; but rather more than half of the stone railing still remains, although it has been prostrated by the weight of the rubbish thrown against it when the stupa was excavated. When General Cunningham first saw the place only three of the railing pillars near the eastern gate were visible above the ground, but a shallow excavation soon brought to light some pillars of the south gate, from which he obtained the measurement of one quadrant of the circle. He was thus able to determine the diameter of the enclosure, the whole of which was afterwards excavated, partly by himself and partly by his assistant Mr. Beglar. In many places the accumulation of rubbish rose to 8 feet in height, and as the stone pillars were lying flat underneath this heap, the amount of excavation was necessarily rather great; but the whole work did not occupy more than six weeks, and all that now exists of this fine railing is now exposed to view.

This colonnade of the Bharahut stupa is of the same age and style as that of the great Sânchi stupa near Bhilsa. But the Sânchi railing is quite plain, while the Bharahut railing is profusely sculptured—every pillar and every rail as well as the whole coping being sculptured on both faces, with an inscription on nearly every stone. From the characters of these inscriptions, as in the similar case of the Sânchi stupa, the erection of the railing must be assigned to the age of Asoka, or about B.C. 250.

The inscriptions are mostly records of the gifts of pillars and rails, like those of the Sânchi and other stupas. But there is also a considerable number of descriptive records, or placards, placed either above or below many of the sculptures. These last are extremely valuable, as they will enable archæologists to identify nearly all the principal figures and scenes that are represented in these ancient bas-reliefs.

Amongst the numerous sculptures at Bharahut there are no naked figures as at Sânchi and at Mathura, but are all well clad, and especially the women, whose heads are generally covered with richly figured cloths, which may be either muslins, or perhaps brocades or shawls. Most of the figures, both male and female, are also profusely adorned with gold and jewelled ornaments, in many of which one of the most significant Buddhist symbols plays a prominent part. The earrings are mostly of one curious massive pattern which is common to both men and women. The *ankûs*, or elephant goad, was also a favourite ornament, which is placed at intervals in the long necklaces of ladies.

At each of the four entrances the corner pillars bore statues, each 4½ feet in height, of *Yakshas* and *Yakshinis* and of *Nâga Rajas*, to whom the guardianship of the gates was entrusted. Thus at the northern gate there are two male figures and one female, which are respectively labelled *Ajakâlaka Yakho*, *Kupiro Yakho*, and *Chadâ Yakhi*, that is, the Yakshas named *Ajakâlaka* and *Kupira*, and the Yakshini *Chandâ*. Other Yakshas are named *Suviloma*, *Virudaka* and *Gangito*, and a second Yakshini is labelled *Yakhini Sudasana*. On two other pillars there are male figures, each with a hood canopy of five snakes' head and each labelled *Nâga Raja*. These have their arms crossed upon their breasts in an attitude of devotion appropriate to their appearance on a Buddhist building. On two middle pillars there are two female statues, respectively labelled *Chukaloka Devatâ* and *Sirimâ Devatâ*, whom General Cunningham takes to be goddesses.

Amongst the scenes represented there are upwards of a dozen of the Buddhist legends called *Jâtakas*, all of which relate to the former births of Buddha. Luckily these also have their appropriate inscriptions, or descriptive labels, without which their identification would hardly have been possible. Amongst these *Jâtakas* are the following:—

(1). *Hansa Jâtaka*, or "Goose-birth," of which the only portion now remaining below the inscription is the expanded tail of a peacock, which must therefore have played some part in the story.

(2). *Kinara Jâtaka*. The Kinaras were a kind of demi-gods. Here two of them, male and female, are represented, with human heads and clad in leaves, standing before some human personage who is seated. The assignment of horses' heads to the Kinaras must therefore belong to a later date.

(3). *Miga Jâtaka*, or the well-known legend of the "Deer," in Sanskrit *Mriga*. General Cunningham calls it a deer and not an antelope, as is generally understood, because all the animals in this bass relief are represented with antlers. The King of Kâsi is seen aiming an arrow at the King of the Deer (Buddha).

(4). *Maghâ Deviya Jâtakam*, or "Magha Devi-birth." General Cunningham knows nothing of this story.

(5). *Yava Majhakiyam Jâtakam*. This title means literally the "mean or average amount of food" which was attained by daily increasing the quantity with the waxing moon and decreasing it with the waning moon. The bas-relief shows a king seated with baskets of grain (?) before him, each bearing a stamp or medallion of a human head. To the left some men are bringing other baskets. Barley *(yava)* would appear to have been the principal food in those days.

(6). *Bhisaharaniya Jâtaka*. A *rishi* (or sage) is seated in front of his hut, with a man and woman standing before him, and a monkey seated on the ground, who is energetically addressing the sage.

(7). *Latuwa-Jâtakam*.—The "Latwa-bird-birth."—This legend apparently refers to some story of a bird and an elephant, of which General Cunningham heard a curious version in Kashmir in 1839. In the bas-relief there is a bee stinging the eye, and a bird pecking the head of an elephant, with a frog croaking close by, while the elephant is treading on a nest of young birds. To the right the same (or a similar) bird is sitting on the branch of a tree over an elephant who is running away with his tail between his legs. Near the top the hind half of an elephant is seen rushing down some rocks. In the Kashmiri version an elephant while feeding throws down a nest of young birds into a stream, where they are all drowned.

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The parent bird seeks the aid of the bees and mosquitoes, who attack the elephant with their stings, and having half blinded him he rushes off towards the stream, and plunging headlong down the rocks is drowned. The fable seems intended to show the power of combination. There can be no doubt that the two legends are substantially the same; and it seems probable that other Buddhist *Jâtakas*, still preserved in modern legends after the lapse of more than 2000 years, may be found. Perhaps this particular legend may be found in the *Pancha Tantra*.

(8). *Vitura punakaya Jâtakam. Vitura* may perhaps be a mistake for *Vithurâ*, "a thief."

Of illustrations of the life of Buddha during his last appearance there are some good examples. The earliest of these is a medallion containing Mâyâ's dream of the white elephant, which is superscribed *Bhagavato Ukdanti*. A second scene belongs to the reign of *Ajâta Satru*, King of Magadha, in the eighth year of whose reign Buddha attained *Nirvâna*. This is labelled.

Ajâtasata Bhagavato vandate.—Some of the well-known assemblies of the Buddhists would also appear to be represented, of which one is called the *Jatila Sabha*. A second probably belongs to a later period of Buddhist history, about midway between the death of Buddha and the reign of Asoka. This sculpture represents a large assembly, and is duly labelled.

Sudhamma Reva Sabha Bhagavato Chudâ Mahâ.—The words *Reva Sabha* probably mean the assembly or synod which was presided over by the famous Buddhist Priest Revato just 100 years after the death of Buddha, or in B.C. 378.

But the Bharahut sculptures are not confined to the legends and events connected with the career of Buddha, as there is at least one bas-relief which illustrates a famous scene in the life of Râma. In this sculpture there are only three figures, of which one seated to the left is holding out an arrow towards a male and female who stand before him—the latter being behind the other. These figures are labelled respectively *Râma* (the rest lost, but most probably *Chandra*), *Janaka Râja* and *Sitala Devi*. General Cunningham believes that this is by far the earliest notice that we possess of the great solar hero Râma and his wife.

General Cunningham looks upon the discovery of these curious sculptures as one of the most valuable acquisitions that has yet been made to our knowledge of ancient India. From them can be learnt what was the dress of all classes of the people of India during the reign of Asoka, or about three-quarters of a century after the death of Alexander the Great. We can see the Queen of India decked out in all her finery, with a flowered shawl or muslin sheet over her head, with massive earrings and elaborate necklaces, and a petticoat reaching to the midleg, which is secured round the waist by a zone of seven strings, as well as by a broad and highly ornamented belt.

Here we can see the soldier with short, curly hair, clad in a long jacket, or tunic, which is tied at the waist, and a dhoti reaching below the knees, with long boots, ornamented with a tassel in front, just like Hessians, and armed with a straight, broad sword, of which the scabbard is three inches wide.

Here also we may see the standard-bearer on horseback, with a human-headed bird surmounting the pole. Here, too, we can see the king mounted on an elephant, escorting a casket of relics. The curious horse-trappings and elephant-housings of the time are given with full and elaborate detail.

Everywhere we may see the peculiar Buddhist symbol which crowns the great stupa at Sânchi used as a favourite ornament. It forms the drop of an earring, the clasp of a necklace, the support of a lamp, the crest of the royal standard, and the decoration of the lady's broad belt and of the soldier's scabbard.

There are also houses of many kinds, and several temples, one of which is labelled *Vijayata pâsâde*, or the "Temple of Victory." There are animals of several kinds, as elephants, horses, deer, cows, and monkeys, and a single specimen of a real tapir. There are numerous crocodiles and fishes, and in one sculpture there is a very large fish, which is represented swallowing two boat-loads of men. There is also a great variety of flowers, and several kinds of fruits, amongst which the mangoe is very happily treated.

But perhaps the most curious of the Bharahut sculptures are a few scenes of broad humour, with elephants and monkeys as the only characters. In two of these an elephant has been captured by a band of monkeys, who have fastened a billet of wood along the inside of his trunk so as to prevent him from moving it. Ropes are fastened to his neck and body, the ends of which are pulled by monkeys, who are walking and dancing in triumphal procession to the sound of shells and cymbals played by other monkeys. The spirit of these scenes is very droll. A third scene represents the monkeys holding a giant by the nose with a pair of pincers, to which is fastened a rope dragged by an elephant. The action and attitudes of the monkeys are very good. The intention of all these designs is exceedingly spirited, but the execution is coarse and weak.

In the short inscriptions on the railing of the Bharahut stupa, General Cunningham found the names of the following places:— *Sugana*, or Srughna; *Vedisa*, or Bhilsa; *Pâtaliputa*, or Patna; *Kosâmbi*, or Kosam; *Nandinagarika*, or Nander; and *Nâsika*, or Nâsik; besides a number of unknown places, of which *Asitamasâ* is most probably some town on the river *Tamasâ* or *Tamas*, the Tons of our maps.

From these inscriptions also General Cunningham has learned the names of several parts of the Buddhist gateways and railings, one of which is a new word, or at least a new form of word, not to be found in the dictionaries.

On the top of *Lâl Pahâr*, or the "Red Hill," which overhangs Bharahut, he obtained a rock inscription of one of the great *Kalachuri* Rajas, Nara Sinha Deva, dated in Samvat (Sake) 909. Altogether General Cunningham and Mr. Beglar have collected about twenty inscriptions of the *Kalachuris*, who took the titles of *Chedindra* and *Chedinarendra*, or "Lord of Chedi," and called the era which they used the *Chedi Samvat* and the *Kalachuri Samvat*.

They have also got an inscription of the great Chalukya Raja Tribhuvana Malla, who began to reign in A.D. 1076, and reigned fifty-one years. The inscription is dated in Sake 1008, or A.D. 1086, and the place of its discovery, Sitabaldi, confirms the account of his having conducted an expedition across the Narbada.

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THE CAROLINE ISLANDS.

THE American mission in Micronesia has a station at Ponape (the *Bornebi* of Keith Johnston's Atlas), one of the principal islands of the Seniavine group, which is one of the many coral groups of the Caroline archipelago. These islands have, as yet, been only cursorily examined. They lie between 3½° and 9½° N. latitude, and extend over thirty degrees of longitude, between the Philippines and the Sandwich Islands, and north of the Solomon Islands and New Guinea. Islands here and there had been sighted, but there was a very imperfect acquaintance with the Caroline Islands until Captain Duperrey, in the 'Coquille,' sailed through the archipelago, and surveyed Ualan, the easternmost island. The Russian Captain Lutke, in his voyage round the world in the corvette 'Seniavine,' in 1828, visited each group of the Caroline archipelago, and acquired a good general acquaintance with their geographical position. The island of Ponape is the chief of the group, to which Lutke gave the name of "Seniavine." It is 50 miles in circumference, and nearly circular, with a peak rising to 2860 feet above the sea; and a surrounding coral reef, within which are many islets. The inhabitants, numbering about 2000, are of Papuan race. The American missionaries from the Sandwich Islands have established a station among these people, and they have a small vessel called the 'Star,' for visiting other islands of the archipelago, and introducing native teachers.

We have received from Mr. Damon, the venerable Seamen's Chaplain at Honolulu, an account of one of the cruises of the 'Star,' by Mr. Doane, one of the missionaries, which, as these islands are so rarely visited, is of some geographical interest.

The 'Star' left Ponape on January 2nd, 1874, sailing N.N.W. to Pakin, a small atoll, some 20 miles distant, with a population of from 75 to 100. This island is a dependency of one of the kings of Ponape—the people the same as those of that island and speaking the same language. The 'Star' passed close under its lee-shore, on the south side, and then headed away for N'gatik, or Raven, or the Seven Islands. N'gatik is the native name, and it is an atoll with some seven or eight islets on its reef. Its position is 5° 47′ 30″ N. lat. and 157° 32′ E. long. The island was discovered in 1773 by a Spaniard, and then re-discovered and re-named by other explorers, each one giving it a new name. The name Seven Islands was probably given from the seven islets on the reef.

This atoll is some 22 miles in circumference, with no passage to the lagoon save a boat passage near an islet on the eastern extremity of the reef—an islet without inhabitants. The natives of N'gatik are in stature and language Ponapeians; and so one might expect their complexion to be, only the "foreign blood" has so largely mingled with the native, that the native colour has been almost bleached out of it. The island has long been the home of foreigners, and painful are the reports afloat of "violence and bloodshed," of "sudden deaths in the lagoons and over the reef;" but they need not be repeated—"Let the dead bury its dead."

Children are numerous, light, and pretty. The missionaries offered to take some to Panope to be educated in their schools, but parents could hardly afford that: it was too far, and they had not mastered their distrust of the missionary. He *might* be a "man-eater" rather than a "soul-teacher," for such are the reports often made about him.

The island is fertile. The bread-fruit, cocoa-nut, sugar-cane, bananas, and onions were seen growing.

A singular piece of masonry was seen on this island. The base was about 12 feet square and raised some 5 feet, solidly laid, with rude steps for ascending. On this another square of less dimensions, some 5 feet square was laid; this again was crowned by a large square stone, which was capped with one standing erect with a crown piece of concave coral stone. This structure is sacred. Prayers and worship are here made to the island divinity, and the hill is free to any one to ascend and offer his devotions. On putting the question, if a missionary would be welcome, some replied "yes"; and it was affecting to see some gathering about one of our Ponape teachers, and holding her hand as if to pin her to the spot at once. The 'Star' then made for the Mortlock group, lying nearly due west from N'gatik. Her approach was in dead silence—not a canoe hastening off to trade with the strangers. It was not until the vessel was near the mouth of the passage that a canoe was seen, though she had run some 10 or 12 miles along the leeward shore, and why was this? The 'Carl,' kidnapping vessel, had been here a few years since, and had stolen a great number of natives. Mr. Doane says, "All hail to Her Majesty's Government for these kidnapped ones who have been restored to their homes. And yet while we shout this pæan of praise to John Bull, what shall be said of the Emperor of Germany, who suffered his flag to be unfurled to cover the coolie trade? Is it possible that Germany, which heads the van in the world's intellectual thought, is also to lead the coolie trade—a relic of the dark ages, a twin of American slavery? It is reported that eighty natives were taken from this island as coolies by a German vessel, to be returned in five years. How often were we asked by mothers and brothers, 'When will they come back?' And how often did we see strings enclosing the house of some one taken away. They are enclosed because sacred to him. No one may inhabit it. With this state of things, we were not surprised at the reception of the 'Star.' At first it was with such an ominous silence; but as she nears the mouth of the passage of the lagoon, a canoe is descried bearing down, headed by a foreigner, a trader, he assuring the natives that there was no danger. We soon met them with a boat, exchanged salutations, and they boarded the 'Star.'

"The first contact with these people prepossesses one in their favour; so mild looking, so gentle, and so far from rudeness that we often said, 'How kind, how woman-like they are'—not as a reproach, but as descriptive of their general bearing. 'Surely these are not savages!'"

The canoe of these islanders is in general style like the canoes of all the islanders of Micronesia, the ever present outrigger and timbers being fastened together by native twine. The dress of the islanders is simple. Their mills do not weave very finely or abundantly! The men wear the *maro*, a thick braid of cloth, about their loins; they wear also the poncho, made from the bark of the hibiscus, two breadths sewn together. It

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extends nearly to the feet. The hair was done up in a top-knot style, ornamented by native beads, hair-pin and comb—this is a small piece of wood slitted into small fine teeth lengthwise, often carved, and cock's feathers sewn to the handle. Tattooing is simple, the arms from the shoulder to the elbow being thus ornamented, save occasionally a semicircle band run across the breast. Children go in undress. The women wear the native tapa, made from the bark of the hibiscus, plainly ornamented and dyed black for a background. The dwellings are simple, the roof being set on the ground, and resting on the eaves. There is a door at each end through which one may crawl, and the interior is dark and stifling. Close to this is the cook-house, black and filthy. Much of the cooking is done upon heated stones. It is with them yet the *stone age;* for nearly all implements of work, axes, knives, and the adze are made from this or something kindred to it—the shell of fish or turtle. Near the dwelling, or apparently in each community, is a building of larger dimensions than has been mentioned. It is a "hotel," a "work-house," a shelter for large *proas*, a play-ground for children, a campus for all meetings. It is rudely made, but strong. Large masks were found at Satoan, an islet of the Mortlock group. They seemed to be used by executioners, that they might do their duty faithfully, and remain unknown.

Mr. Doane then gives the following account of the islands of the Mortlock group :—

THE MORTLOCK GROUP.

Now that we have spoken of the Mortlock group, described the people and their customs, it remains only to speak of the separate islands. The group we have named was discovered in 1793, by Mortlock, who commanded the 'Young William,' and both names are given to the cluster, consisting of three atolls, separated by channels, from 5 to 7 miles in width, their names being Satoan, Etal, and Lukunor. The 'Star' visited Satoan first, which bears the name of the discoverer, but it is proposed to re-name the atoll from its most important islet, Satoan, it being the most fertile, most populous, and evidently the oldest land formation of the island. This change of name is proposed on account of there being no other island in all the group of sister atolls but which bears, as it should, a native name. Satoan lies in 5° 27′ N. lat. and 153° 30′ E. long. Two passages offer access to the lagoon, one on the south side and one on the north. The depth of the 'Star's' anchorage was 19 fathoms. Some 60 islets crown the reef of this atoll, some being several miles in length, and well wooded and fruitful; others mere pin heads in size. It was frequently observed that neither the reef proper nor land formation had the breadth of some coral islands in Eastern Micronesia. The bread-fruit, cocoa-nut, pandanas and other plants and trees abound here. Wild pigeons and smaller birds were seen. The population is computed to be about 1500. One islet, some 4 or more miles long, has a population of 600. The language of this island and of all its sister atolls, Etal, Lukunor, Namaluk, Losap, Nama, is the same. In leaving Satoan it may be remarked, early navigators have represented the natives as treacherous, "were not to be trusted, no matter how friendly they may appear." The 'Star' can deny that charge. From the first day of her anchoring to the last, here and at Lukunor, not the least treacherous sign was seen; nor indeed is it known that a single article was stolen. Yet natives were numerous on deck, going and coming, and visits were made ashore without fear.

Passing from Satoan, the 'Star' sailed across the lagoon, going out at the northern outlet. It is a lagoon of much beauty and safety, because so free from coral patches. Bearing N.N.E. in lat. 5° 38′ and 153° 24′ long. is Etal, distant some 7 miles, an island without a ship passage; but its reef is crowned with a luxuriant growth of vegetation on its islets. The 'Star' did not touch here. It is spoken of as a beautiful atoll. The population may number some 600 or more. The language and customs of the people are similar to those of Satoan, with which a free communication is kept up by large *proas*.

Passing by Etal, the 'Star' ran N.W. some 25 miles to Namaluk, whose position is 5° 55′ N. lat., 153° 13′ E. long. Approaching this island, three large islets were seen, crowning the reef, verdant, and apparently thickly wooded. The more than usual height of the trees seemed to give to the atoll an unusual elevation, as if partly heaved up by volcanic force. Reaching this island near sunset, there was no time for exploration; but, as the 'Star' passed along to the lee shore, groups of natives were seen sitting beneath the trees, watching the approach of the vessel, a sight to them no doubt strange, as not many ships touch here. This cautiousness of the people not to launch a *proa*, and "come off," indicated fear; and so it was, for here were found those who had been kipnapped by the 'Carl,' and taken to a Fiji plantation. Perceiving their unwillingness to come to the 'Star,' a boat was sent to them. Three friendly natives from Satoan accompanied, and going up to the group, told them who the strangers were—friendly missionaries. A few threw aside all fear, came to us and shook hands, heard a message, bartered a little, and then with a friendly "good-bye," were left. The language, customs, and tattooing, all were one with the Satoans. No ship passage; merely one large enough for a boat was seen. The population numbers from 300 to 500.

The day closing, the 'Star' filled away for Losap, N.W., distant some 60 miles. Its position is 7° 3′ 40″ N. lat. and 152° 42′ 20″ E. long. Nearing this atoll the natives were cautious as at Namaluk. Flogging on a Fiji plantation had no charms for them. It was observed that the island had the appearance of an unusual elevation as at the one just passed. Nothing like volcanic forces working in ages past could be seen. As the 'Star' neared the island, natives were seen walking on the beach; none came off. The boat was sent in, accompanied by the friendly natives of Satoan. A ship's passage was seen; there may be more on the west side. The boat passed into the lagoon, and passed up about half way to the landing-place of a high chief. The company were received with kindness, young cocoa-nuts being brought as a peace offering. The high chief was very friendly, and would gladly take a missionary teacher. All the surroundings of the people, their language, dress, *proas*, ornaments, tattooing, dwellings, the children in undress, and the women with the native tapa, showed they were kith and kin with the islanders already visited. The population may reach 500. The island

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seemed fertile, and capable of furnishing plenty of food.

North-west of Losap lies the atoll Nama, round, small, and without lagoons; fertile, crowded with a forest of bread-fruit trees and cocoa-nuts—a tombstone in mid ocean of some buried mountain peak. The island is not put down in *Findlay's Directory*. It is some 10 miles N.W. from Losap. As the 'Star' neared this pin-head of an island, natives were seen grouped on the shore, apparently awaiting her approach. The landing is evidently on the west or lee side, over the reef in a smooth surf. But time did not permit us to send a boat. We learned from the natives with us that the population is small, some 150 or 200—if, indeed, amounting to that. The language and people are one with the islands south, at which we had touched.

LUKUNOR, THE GEM OF THE CORAL ISLANDS.

The 'Star' headed away from this people for Ruku, the higher mountain peaks of which were seen near sunset; but it was thought best not to sail on further, so she tacked about and headed for Lukunor, a sister island of Satoan, whose position is in N. lat. 5° 27′, and E. long. 153° 27′. And here we find, if I mistake not, the gem of the coral islands in Micronesia. The lagoon, comparatively free from coral patches, and the islets fertile, and so situated as to protect the anchoring ground, which has a fine bottom, and close in to the shore, if needed, and not deep, the contour of the atoll, the mildness of the people, all combined to make this a beautiful island. There is but one passage, though of easy access, on the south side. The island may be some 18 miles in circumference. Four large islets, not contiguous, nor very widely separated, crown the reef. On the main islet two large taro patches were seen, evidently highly cultivated, and divided off into sections, marking the ownership of each. And it was observed how much there was of a rude kind of fencing on the main land as if each one's little farm must be definitely bounded—a little ludicrous we thought, as the whole islet would not satisfy a western farmer for his plantation. Wild pigeons are more or less numerous, and a small bird, with cheery note, was seen. The houses and *proas*, the dress and ornaments of the people, the maro and poncho of the men, with the simple skirt of the women, and the nakedness of the children, and their language, marked this people as one with the Satoanites; and their proximity enables them to have frequent communication with each other. The population may be put down at 1500. The children are numerous, a hopeful sign for the future of the teacher located here.

Leaving this island, the 'Star' touched at Satoan for a few last words with the teachers there, and then laid her course for Nukuwor, or the Monteverde Island, located in N. lat. 3° 55′ and E. long. 154° 56′. This island was discovered by Monteverde, a Spaniard, in 1806. It is small, being not more than 12 or 15 miles round. It has a passage for small vessels. The reef was dotted with islets, some thirty crowning and adorning it. The natives are of Samoan descent. Their splendid forms marked this as well as their language. It has but little affinity with the islands of the north. The population is small, numbering some 150. In times past it has been larger, but feticide, so very common, has lessened it sadly. The natives seemed cheerful and lively, going off to a vessel, at rather a venturesome distance, for barter. Idols, carved from wood, are common here, a very large one being in their temple. This is probably the only people in all Micronesia who worship idols carved out. With all of them are stones, trees, animals, birds and fish, dressed and made sacred, but without the carved image. This fact seems to point to a different origin, for this people have retained the custom of their ancestors at the south, or have taken it from natives who may have drifted to them from the west. No opportunity was offered here to land, though the natives are friendly. A trader resides here. It is manifestly the iron age with this people, as iron hoop was eagerly taken in exchange for their small wares.

The 'Star' could stay here but a short time, as the day was fast closing. So, telling the venturous ones to return home, as a light was burning for them on the shore, we parted, they for their coral reef and we for the more ambitious high island, Ponape.

During all this cruise no accident befell the 'Star;' no demonstration of treachery from the natives; not even a nail was stolen. The teachers were welcomed and readily found homes among the people they sought to live with.

THE TREATY BETWEEN FRANCE AND TONQUIN.

IT appears from advices from Tonquin that the melancholy fate of Garnier has deterred France from annexing any part of Tonquin, or organizing a real mart on the Sonka River. But through the exertions of M. Dupuis, whose name as our readers will remember has been associated with the exploration of that important stream, a treaty has been negotiated, and by means of it commercial advantages of no slight value may be anticipated, the kingdom of Annam being thereby thrown open to European trade.

The principal stipulations are as follows:—

1. Three ports to be open for trading purposes, one being Hannoy in the province of Tonquin.

2. Europeans to be permitted to reside and possess real property in the above-mentioned ports, under the protection of a French Consul and a garrison of 100 men.

3. Foreigners to be permitted to travel in the interior without restriction, if provided with passports viséd by the French Consul.

4. Chinese goods to be allowed free transit through Tonquin.

5. The Roman Catholic religion to be allowed free exercise throughout the kingdom.

6. An indemnity to be paid by the Annam Government to Spain of 1,000,000 dollars.

7. The French Government to cede to Annam five steamers, each 500 horse-power, 100 field-pieces, and 1000 breech-loading rifles.

8. The Annam Government to apply to no other power but France for aid in case of rebellion or internal dissensions.

The above treaty was signed and ratified on the 14th of March, and proclaimed by a royal salute of 101 guns.

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Reviews.

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ANCIENT GEOGRAPHY OF INDIA.*

IF the early records of India yield little that can be called history, and no chronology, they certainly throw much light on comparative geography; and it is from this point of view that we propose to make a few remarks on the history of India by Mr. Talboys Wheeler. The present volume tells the history from a Hindu, Buddhist, and Brahmanical point of view, from the remotest antiquity to the arrival of the Portuguese; but it does not deal with the Mussulman conquests, or the Mussulman empire. Those subjects are reserved for future consideration.

The principal materials for a Hindu history are the hymns of the Rig Veda, the most ancient records in the world; the two great epics of the Mahá Bhárata and Ramayana referring to periods with a long interval between them; the life and teachings of Buddha; and the edicts of Asoka. As each of these records refer to epochs widely separated in point of time, they display to us the gradual movements of populations, and with them the changes in the physical aspect of India at different periods. Thus they convey some knowledge of the comparative geography of the country; and verify the conclusions of physical geographers and geologists.

India is divided into three zones, namely Hindustan Proper, Dekhan, and the Peninsula; which are formed by three lines running east and west; the Himalayan wall to the north of Hindustan, the Vindhyan range to the north of the Dekhan, and the river Krishna which separates the Dekhan from the Peninsula. Mr. Wheeler conjectures that the earliest tides of emigration followed the courses of the two monsoons; and that, in the remotest past, men from the unknown south and west of a bygone world were driven in rude craft by the S.W. monsoon from the southern and Indian oceans towards the western coasts of India. Then tides of Turanian invasion may have been driven, by the chilly blasts of the N.E. monsoon, down the valley of the Brahmaputra; and so gradually have spread over the country. Finally, in a later age, the Aryans on the N.W. seem to have entered the Punjab, and gradually spread their invasion over India. Of the two former immigrations no record exists. It is among the Aryans only that the memory of far distant events is preserved.

The Aryans of the Rig Veda were established in the Punjab, and their dominion extended to the Saraswati, between the basins of the Indus and the Ganges. They gradually made themselves masters of the greater part of Hindustan, and then filtered towards the south, carrying Aryan civilization and culture amongst the Dravidian (Turanian) population of the peninsula.

In the earliest dawn of history we find the Aryans with their boundary on the banks of the Saraswati. Beyond were the rich valleys of the Jumna and the Ganges, two streams which, after uniting at Allahabad, the ancient Prayága, form the mighty river which has deposited a delta of inexhaustible fertility, and finally falls into the bay of Bengal. We learn from the phenomena of the Ganges that, 4000 to 5000 years ago the sea, or at least the tide, extended as far as Rajmahal, and that Bengal Proper was a vast bay or lagoon, like the Rio de la Plata in South America. The gradual raising of the delta, which caused the lower part of the Gangetic basin to become inhabitable, is indicated by the positions of the capital cities which were first on the Saraswati, and were established lower down the Ganges valley by successive dynasties, as the progress of the physical changes rendered the former lagoons and swamps fit places for the abodes of men.

Prayága, the modern Allahabad, from its strategic position at the junction of the Ganges and Jumna, was looked upon as the centre of Hindostan, the holiest place of sacrifice for the Rishis, and the most commanding stronghold for the Kshatriyas.

The first cities really in the plains were Indraprastha (Delhi) on the Jumna, and Hastinapura on the Ganges, at the northern entrance of the two valleys. Then a long period elapsed. The second line was half way down the two valleys, and connected four more advanced positions, namely, Agra on the Jumna; Kanouj on the Ganges; Lucknow on the Gumti; and Ayodhya on the Gogra. At a later date Patali-putra (Patna) became a great capital. Then, as the delta became inhabitable, the city of Gour arose near the point where the main stream diverges into the Hugli and Ganges; and finally Dacca was built in 1604.

Thus, in 3000 B.C., the only practically inhabited part of the alluvial plain of India was the water-parting between the Sutlej and the Jumna. The rest has only gradually become fit for man's occupation within the historical period, and hundreds of square miles of the delta have become inhabitable since the days of Clive.

This gradual progress is admirably brought out in Mr. Wheeler's narrative; and shows the great value of historical and archæological researches to the student of physical geography. The fifth chapter of this volume contains an interesting narrative of the journeys of the two most famous of ancient Asiatic travellers, Fa Hian and Hiouen Thsang, the records of which are of such importance in the study of early Indian topography. Of the historical value of Mr. Wheeler's work we have not ventured to speak; but we can confidently say that it is a really important guide to the student of Indian comparative geography.

* *The History of India: Hindu, Buddhist, and Brahmanical.* By J. Talboys Wheeler, Secretary to the Chief Commissioner of British India. (Trübner, 1874.)

ON THE ROAD TO KHIVA.*

THE appearance of this book about the same time as that of a work of a similar nature and scope—we mean Mr. MacGahan's volume on the Khivan Expedition—provokes, if not comparison, at least a feeling of regret that, with all his advantages, Mr. Ker, the author, was not more successful in his endeavour to join the expeditionary forces and witness the campaign. He had on his side youth, an athletic frame and good constitution, plenty of money, considerable experience in travel, having journeyed in Brazil, Egypt, Arabia, the Holy Land, and other countries, a good colloquial knowledge of foreign languages, and last, but not least, abundance of energy, a superfluous portion of which he worked off during his detention at Kazalinsk on the Jaxartes, by a rather purposeless

* *On the Road to Khiva.* By David Ker, late Khivan Special Correspondent of the *Daily Telegraph*. H. S. King & Co. 1874.

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16 miles walk in the desert and frequent swims across the river. But Mr. Ker never succeeded in getting nearer to Khiva than Samarcand, and though it is not quite clear that he let slip any good opportunities on the road, he was certainly much too late in the field, a blunder most probably attributable to the fault of his employers.

The author started for Khiva on the 8th of March, 1873, travelling by way of the Black Sea, Poti, and Tiflis. Having learnt here that the western expeditionary columns had already started, he shaped his course for Orenburg and Fort Kazalinsk, at which not over interesting place he was stopped by the Governor, and not allowed to proceed until the necessary permission had been obtained from the Commander-in-Chief. The fact was, Mr. MacGahan's plucky ride across the desert, in defiance of all opposing orders, had whetted the vigilance of the officials, the commandant at Fort Perovsky having been actually court-martialled for not stopping him, though we are glad to learn from MacGahan that General Kaufmann, with a generosity which does him credit, not only afterwards reinstated the commandant, but even gave him a higher post.

For upwards of fifty days Mr. Ker was kept in durance at Kazalinsk, but the time does not appear to have hung heavily on his hands. There is a great deal of *character* in Central Asian towns; and the mixture of numerous races, the quaintness of the buildings and bazaars all afforded him material for his pen; and in his descriptions of these he shows considerable liveliness, humour and appreciation of the picturesque. On one occasion indeed a rare chance of attaining his end presented itself. The 'Samarcand' steamer, one of the Aral flotilla, arrived at Kazalinsk with the Grand Duke Nicholas, General Verevkin, and other officers on board. The author at the suggestion of Lieutenant Stumm (the only foreigner besides Mr. MacGahan, who succeeded in reaching Khiva), applied for a passage in the vessel to Kungrad, and through the kindness of the young Grand Duke this was at first granted, only, however, to be revoked immediately after on the ground of an English passport not being admissible. But through the intervention of a friend leave was obtained for Mr. Ker to proceed to Tashkend. Tashkend is a place where apparently civilization is making great strides. There are hotels, cabs, luxurious gardens with pavilions and shrubberies impervious to the mid-day sun, streets like well-planted avenues intersected by rills of water, and lastly an officers' club, where the author and his companion got clear soup and cutlets.

From Tashkend Mr. Ker crossed the eastern angle of the Kizil-Kum and the Syr Daria, travelled through Chinaz and the gates of Tamerlane, forded the Zerafshan, and entered Samarcand. Of this famous city he remarks:—

> Fallen as it is from its former high estate, the city of Timour still ranks high among the commercial centres of the East. Merchants come to it from distant countries, and among the motley throng in its market-place you may notice at times the slim, graceful, high-bred Arab, or the pliant limbs and smooth, obsequious face of the Bengalee. European goods of every kind are largely imported, and skins, knives, carpets, silks, embroidered saddles, &c., are exported in vast quantities. The city itself is surrounded by a massive wall, containing six fine gateways, and enclosing an enormous space of ground. With respect to the population, I am inclined to regard the official estimate of 30,000 inhabitants—made at the time of its capture in 1868—as an under-statement; but it is always difficult to ascertain the population of an Asiatic city (especially one so fluctuating as Samarcand) with any accuracy.

At Samarcand great hospitality was shown to the travellers by General Abramoff, and they occupied themselves in visiting, among other sights, the grave of Timur. The grand sepulchre, with its magnificent pointed archway in front, its majestic dimensions and absence of meretricious ornament, appears to have fully impressed the author. The University of Samarcand—where however, they learn little beyond scraps of the Koran—presented the appearance of a disused cellar inhabited by a gang of thieves. A chapter is devoted to a spirited description of the siege of Samarcand, in which a resolute garrison of 600 Russians successfully kept off a motley army of Sarts, Bokhariots, Shehri-Sabzians, and Persians, numbering no less than 20,000, till General Kaufmann came to raise the siege.

Of course, the author contributes his views of the Central Asian question, and in the main we agree with them. He predicts that Kokan, Bokhara and Kashgar, will eventually fall beneath the advancing wave of Russian power, but the annexation of Kuldja and the making of roads through the Tian-Shan, he thinks, points indubitably to the *next* move, which will be directed towards China. The only observation we would make on this subject is that the course of events are doubtless shaping themselves towards a collision between Russia and China; but that the actual *casus belli* will probably break out far away to the east, on the Amur. In such a case, the Amîr of Kashgaria would gladly co-operate with the Russian arms, and gain their favour. But Russia will never brook a Muhammadan ally in her wars, and her policy will doubtless be to coldly discourage the Amîr, till a more favourable opportunity should occur for annexing his dominions.

Mr. Ker uses language of too strong a character when he sees in the manner of the Government of Kazalinsk, for the hundreth time, the under-current of deep hatred that boils up against us below the smooth surface of diplomatic courtesy. The unanimous testimony of Englishmen, as well as foreigners, who have seen much of Russian military society, convinces us that their officers are perhaps jealous of us, but that in their minds there is too much of admiration for our energy and bravery for any substantial dislike to be harboured. In conclusion, we would express our pleasure at the lively manner in which the author writes; while his fund of good stories will, we predict, always make him a pleasant companion to those with whom he undertakes future travels.

REPORT UPON THE RAINFALL OF BARBADOS, AND UPON ITS INFLUENCE ON THE SUGAR CROPS, 1847—71. By *Governor Rawson, C.B.* (Ordered to be printed by the House of Assembly.) Barbados, 1874.

BARBADOS is an island containing 166 square miles, situated in 13° N. latitude, and about 80 miles outside, and eastward of the belt of islands forming the windward portion of the group which encircles the Caribbean Sea. Its primitive forests have disappeared, and it presents one vast cultivated field of sugar-cane, food grain, and root crops; the highest part being 1147 feet above the sea. The island is exposed to the trade winds, varying but slightly from N.E. during three-fourths of the year,

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and the rain comes chiefly from the same quarter. The present Governor has done very excellent service to the island, by the preparation of this valuable report on the rainfall of Barbados. For the purposes of his enquiry he divides the island into six districts, three on the windward and chiefly highland portion, and three to leeward. There is a station for observing the rainfall in every square mile on the island.

The mean rainfall of Barbados is established, on an average of twenty-five years, at 57.47 inches. The driest month is March, when the average rainfall is about 1¼ inch; and the wettest is October when the average is nearly 9 inches.

One of the objects of the Report is to assist those who are interested in calculating the probability of coming seasons; but its chief aim is to apply the information, very carefully collected, to an examination of the influence of the rainfall on the staple crop of the island—the sugar crop. This crop now nearly doubles the highest before the emancipation. It is not affected by other causes, so that its present dependence on the rainfall may be clearly traced and measured. The yield in 1869 was 32,150 hogsheads of sugar. The Governor's conclusions are that the rainfall influences the crop of the following year, but not that of the current year, and that a dry season injures the crop by one-fifth more than a wet season benefits it. This system of comparing the relation between the rainfall and the crops (especially sugar) may be of service to the agriculturalists of other countries, who will derive some useful materials and suggestions from Governor Rawson's very able Report.

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THE RUDIMENTS OF PHYSICAL GEOGRAPHY FOR THE USE OF INDIAN SCHOOLS; together with a Sketch of the Physical Structure and Climate of India. By *Henry F. Blanford, F.G.S.* (Calcutta, 1873.)

MR. BLANFORD has prepared this excellent little text book of physical geography for the use of Indian students. It was found that the text books now available deal more especially with objects familiar or common in Europe, and have but few references to such as are interesting and familiar to the Indian learner. The present treatise has, therefore, been written with the object of interesting students in India, by illustrating facts in physical geography through phenomena and places which are known to them. The concluding chapters give the only popular description that has yet appeared of the geology and climate of India. On these subjects there is no one who can speak with more authority than Mr. H. F. Blanford, who has served on the Geological Survey, and has for some years been in charge of the meteorology of Bengal; and it is very desirable that his excellent little work, certainly the two last chapters, should be re-published in this country.

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PETERMANN'S MITTHEILUNGEN.

No. VII., 1874.

DR. JOSEPH CHAVANNE, of Vienna, contributes the following interesting paper, based almost entirely on meteorological considerations, on the probable existence and character of the undiscovered Arctic Regions:—

THE ARCTIC CONTINENT AND OCEAN.

Our means of solving the great Arctic problem have been much enriched during the last five years by the work of the Norwegians, Swedes, Germans and Americans, and the general tendency of these results is to confirm, in a remarkable manner, the opinion put forward by Dr. Petermann, respecting the existence of an Arctic Continent, and of an occasionally open Polar Sea northwards of the 80th parallel of north latitude. Very valuable light is also thrown on the question by the scientific observations of Hayes and Kane in Smith's Sound, of McClintock in Port Kennedy, of Sievert Tobiesen on Bear Island, and of Wrangell in Nishne Kolymsk. The writer has, however, not failed to examine every authority, from the time of Barents down to Weyprecht and Payer, at present in the far north, so as to consider the question from every standpoint of view.

Looking at the map, we find that from 30° E. eastwards as far as 90° W. longitude, "the unknown region" extends northward of the 77th parallel of latitude, while from 90° W. longitude eastward, as far as 30° E. longitude, Grinnell Land and Greenland jut out northwards beyond 83° N. latitude, while Spitzbergen and Gillis Land reach the 80th parallel. Nothing definite is known of the mysterious region which lies to the north of these limits. In Petermann's map of the Arctic and Antarctic Regions (Map No. 5 of 1865) the continuation of Greenland is shown in the likeness of a broad strip of land from 30 to 70 miles (German) in width, and extending right over to Cape Yakan, while the remaining space, over 120,000 square miles in area, is shown as sea. This view, to a certain extent, received confirmation from Captain Long's discovery of the land north of Behring Straits; and the more recent journeys of Johannesen, Mack, Ulve, Leigh Smith, Torkildsen, Payer and Weyprecht, bear witness that the sea between Spitzbergen and Novaya Zemlya is not unfrequently navigable.

The precise questions which the writer now seeks to elucidate are the following:—1stly. Does the land north of Behring's Straits form a continuation of Greenland, or does the latter continent end north of Shannon Island, and trend away to the north-west? 2ndly. What is the extent of the land north of the 80th parallel on the American and on the Asiatic side? 3rdly. Is Grinnell Land an island or connected with Greenland?

The isothermal lines of temperature, the difference between the year's average of heat and cold, the distribution of wind as well as its temperature and direction, as observed at different stations situated along the edge of the vast crater-shaped mass of land which bounds the Arctic regions to the south, will enable us to answer the above questions satisfactorily.

Were the Polar region northward of 80° north latitude one uniform ocean, we should expect, as we proceeded northward, judging from the climatic effects of the Gulf Stream, and other ocean currents, a uniformly decreased difference, or, in other words, an approximation between the winter and summer mean temperature, a tendency on the part of the point of extreme cold to coincide with the geographical pole, a pervading dampness and comparative mildness in all north winds, and a modification or assimilation between the characteristics of the Polar and Equatorial currents. A glance at the following tables will dissipate notions of this kind:—

THE MEAN TEMPERATURE OF WINTER AND SUMMER IN THE ARCTIC REGIONS.

Between 30° W. and 30° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Reikiavik	—1.8	11.0	12.8
Stykkisholm	—3.0	8.0	11.0
Eya Fiord	—6.2	7.7	13.9
Petersburg	—8.1	16.0	24.1
Mean	—4.8	10.7	15.5

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Vardö	—5.5	8.2	13.7
Vadsö	—9.0	7.5	16.5
Hammerfest	—5.1	10.0	15.1
Hayö	—7.3	6.2	13.5
Magerö	—4.7	6.4	11.1
Bear Island	—13.2	4.8	18.0
Mussle Bay	—15.7	5.4	21.1
Ice Fiord	—14.6	4.0	18.6
Mean	—9.4	6.6	16.0

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Between 30° and 90° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Kola	—8.6	14.4	23.0
Archangel	—12.1	14.1	26.2
Beresof	—21.4	14.5	35.9
Mean	—14.0	14.3	28.1

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Matochkin Sharr	—19.0	3.6	22.6
Rock Bay	—16.0	2.0	18.0
Shallow Bay	—14.6	4.0	18.6
Tobiesen's Winter Harbour	—23.3	3.2	26.5
Mean	—18.2	3.2	21.4

Between 90° and 150° E. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Yakutsk	—38.2	14.9	53.1

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Taimir Land	—25.7	7.3	33.0
Ustyansk	—37.8	8.2	46.0
Mean	—31.8	7.8	39.6

Between 150° E. and 150° W. longitude.

From 60° to 70° N lat.	Winter.	Summer.	Difference.
Nishne Kolymsk	—31.0	10.6	41.6
Ikagmut	—17.3	15.2	32.5
Kotzebue Sound	—21.9	6.7	28.6
Mean	—23.4	10.8	34.2

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Point Barrow	—27.8	3.4	31.2

Between 150° and 90° W. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Fort Yukon	—31.1	15.4	46.5
,, Franklin	—27.1	10.1	37.2
,, Confidence	—30.5	9.0	39.5
Cambridge Bay	—36.3	3.1	39.4
Felix Harbour	—32.6	4.9	37.5
Mean	—31.5	8.5	40.0

From 70° to 80° N. lat.	Winter.	Summer.	Difference.
Camden Bay	—31.5	2.2	33.7
Walker ,,	—27.7	3.8	31.5
Mercy ,,	—34.6	1.7	36.3
Prince of Wales Strait	—35.1	2.6	37.7
Winter Harbour	—34.3	2.8	37.1
Cape Cockburn	—38.1	2.0	40.1
Dealy Island	—35.0	1.2	36.2
Griffith's ,,	—33.9	1.3	35.2
Northumberland Sound	—37.2	0.6	37.8
Port Kennedy	—37.3	3.1	40.4
Wellington Channel	—37.4	1.1	38.5
Beechey Island	—33.5	2.0	35.5
Port Leopold	—35.5	1.0	36.5
Mean	—34.7	2.0	36.7

Between 90° and 30° W. longitude.

From 60° to 70° N. lat.	Winter.	Summer.	Difference.
Fort Hope	—31.7	4.4	36.1
Winter Island	—29.1	1.7	30.8
Igloolik	—29.6	1.6	31.2
Lichtenau	—4.8	7.6	12.4
Godthaab	—10.0	4.8	14.8
Jacobshavn	—17.4	5.8	23.2
Mean	—20.4	4.3	24.7

From 70° to 80° N. lat.	Winte	Summer.	Difference.
Port Bowen	—31.7	2.4	34.1
Sheriff's Harbour	—32.2	1.9	34.1
Port Foulke	—29.5	2.7	32.2
Rensselaer Harbour	—35.0	0.7	35.7
Wolstenholm Sound	—33.7	3.3	37.0
Upernivik	—24.7	3.4	28.1
Omenak	—20.7	6.9	25.6
Mean	—20.6	2.8	32.4

Taking the above figures as a basis, the mean winter temperature at the North Pole would be 28·8 C., in summer —1·7, and the difference 30·5 degrees. As in the case of the first, eleventh, and twelfth of the above groups the range of temperature increases as one goes northward, one may fairly expect that to the north of these regions (*i.e.*, north of Spitzbergen and Smith's Sound) land is to be met with. The comparatively high summer temperature at Nishne Kolymsk, Spitzbergen, Kotzebue Sound, at Port Barrow, and in Polaris Bay, taken in conjunction with the proximity of the point of greatest cold, is an additional argument towards the existence of an extensive Arctic continent. This is further confirmed by the range of maximum and minimum temperature, which at Bear Island, at Tobiesen's winter quarters in Novaya Zemlya, at Mussle Bay, Port Kennedy, and Rensselaer Harbour, actually amounts to an average for the five stations of 52·8 degrees.

The wind temperature is of great importance, affording as it does (as Maury remarked) a sure indication of the climate of the region whence it comes, while as it is affected in a great measure by the geographical features of the same, we may assume that it conveys information on this head as well. It is thus absolutely necessary to take into consideration the general character and dimensions of the land over which the winds blow, for to leave this out of sight leads to the formation of wrong conclusions respecting the comparative warmth and low pressure of the northern winds at various points along the north coast of Europe. At Port Kennedy, Rensselaer Harbour, and on the north-west coast of Novaya Zemlya, the south-east and south-west winds, which are the warmest, are accompanied by very high atmospheric pressure, the fact being that north of 70° N. latitude the maxima and minima of the barometer and thermometer are not so uniformly opposed to each other as we in more southerly regions are accustomed to find them.

At Bear Island, in Ice Fiord (as well as Mussle Bay), in Tobiesen's winter quarters in Novaya Zemlya, at Yakutsk, Port Kennedy, Godthaab, and Reikiavik, it will be seen from the table on the following page, that in winter north winds reduce the temperature from 0.2° to 4.5° below the mean. At Bear Island the cold is greatest with a north-north-east, in Ice Fiord with a north, in Novaya Zemlya, at Tobiesen's winter quarters, with a north-east, and Yakutsk with a north wind; while proceeding eastward along the northern coast of Asia, the cold winds shift round to the west, at Nishne Kolymsk the temperature being lowest with a north-west, and at Port Kennedy, with a north-north-west wind. Again, fourteen degrees eastward, at Godthaab, it is the north-east, and at Reikiavik, the north wind which is coldest. This is accounted for by the fact that the coldest winds come from the heart of the Arctic continent. Moreover, northwards of Bear Island and Spitzbergen, Nishne Kolymsk, Godthaab and Reikiavik it is exceedingly probable that land exists (and not, as the Swedes and English so strenuously assert, an immovable *mer-de-glace*) because the north winds in summer at those stations raise the temperature above the average, a feature which, in the absence of local or other causes, is due to the isolated or sea-girt character of the Arctic region.

Turning to the question of the northern limits of Greenland, it will be remembered that Clavering and Sabine sighted the coast as far as 76° N. latitude, and the Germans in sledges as far as 77°1′, while Barrington gave it as his opinion that it had been discovered to extend as far as 79°30, and probably stretched still further in a N.N.E. direction. Judging from its steep and mountainous character, Dr. Chavanne would incline, by the light of the atmospheric data, to think that Barrington was right, and that Gillis Land forms a promontory of the Arctic continent, the former lying two or three degrees of latitude north of the former. This is corroborated by Parry's journey in 1827, and Payer and Weyprecht's a few years back, all of whom

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met masses of ice covered with vegetable matter, drift-wood covered with mud, animals rarely seen except near land, and a uniform diminution of depth in the soundings. The absence of icebergs, and the rapidity with which, as Parry tells us, the masses of ice were borne southward by the current north of Spitzbergen, proves that towards the Pole the land assumes a flatter character and lower level. Duner informs us that from the north coast of Spitzbergen the birds fly northward. Wrangell Land, seen by Kellett, and re-discovered by Long, from its abrupt mountainous character may be assumed to be a continuation of Greenland. Clarke also, the successor of Cook, argued that an Arctic land must lie northward of Behrings Straits from the southerly flight of birds of passage.

The southerly current in Robeson Channel, the fact that the tide rises sooner in Newman Bay than in Polaris Bay, and the discovery of driftwood (*Larix* and *Abies Arctica*) on those shores, all go to prove the existence of a current from Behring's Straits northward toward Smith Sound. Moreover, the *Platycarya* drift-wood, which must come from Japan, could only be deposited on the shores of Robeson Channel by this route, for its absence in the Polynia, and on the north coast of the Tchukt peninsula, shows what direction it takes, when once within the Arctic Ocean. The stream which conveys this drift-wood is a branch of the warm Kurosiwo, and in spring and summer it flows northward, washing the east coast of Wrangell Land, and clearing it of ice, a fact which Captain Raynor in the *Pacific Commercial Advertiser* of the 9th of November, 1867, and Captain Long, in his account of his travels, draw attention to. It is the same warm stream which, with an E.S.E. wind, raises the winter temperature at Nishne Kolymsk, and which lends fertility to the vegetation in Kotzebue Sound and Chamisso island, the Asiatic side being bleak and dreary in the extreme.

Dr. Chavanne cites numerous instances in which the Arctic Sea between Spitzbergen and Behring's Straits has been found to be not only practicable for navigation, but even quite free from ice, and concludes by laying down the following general conclusions, which he draws from the above arguments:—

1.—The major axis of the Arctic continent (which is probably broken up by narrow straits or fiords) lies across the North Pole; Greenland, too, does not come to an end north of Shannon Island, and trend away to the north-west, but runs northward as far as 83° or 84° N. latitude, and thence extends in a north-east or north-north-easterly direction.

2.—The eastern coast of this mass of Arctic land will be found to lie somewhere between 25° and 170° E. longitude, in 84° and 85° N. latitude; and the west coast between 90° and 170° W. longitude, and 86° and 80° of N. latitude.

3.—Robeson Channel, which suddenly widens out north of 82° 16′ N. latitude, trends round to the west in 84° N. latitude, and thus leaves Smith Sound in direct communication with Behring's Straits. Grinnell Land is an island probably extending as far as 95° W. longitude, while Parry Islands to the south occupy the sea west of Jones Sound.

4.—The sea between the coast of the Arctic continent and the north coast of America is traversed by a branch of the warm Kurosiwo stream, which flows through Behring's Straits, and is thus occasionally free from ice, the warm stream flowing over as far as Smith Sound.

5.—The northern arm of the Gulf Stream which flows between Bear Island and Novaya Zemlya touches the northern coast of Asia, and, eastward of the New Siberia Islands, joins the western drift of the Kurosiwo. The other northern arm or branch of the Gulf Stream, which flows past the western coast of Spitzbergen and the Seven Islands, is submerged for a time beneath the Polar current, to reappear at the surface further northward, and thence lave the shores of the Arctic continent, which thus is washed by two warm streams, rendering the existence of perennial ice a sheer impossibility.

6.—The average altitude of the Polar Land above the level of the sea diminishes as it approaches the North Pole.

7.—The sea between Spitzbergen and Novaya Zemlya, as far as Behring's Straits, is even in winter partly free from ice, and admits of navigation in summer and autumn.

8.—The most promising route to the North Pole is, firstly, between Spitzbergen and Novaya Zemlya; and, secondly, by the sea north of Behring's Straits, along the coast of the unknown Polar Land.

TEMPERATURE OF THE WINDS.

Table showing Deviations from Mean Temperature.

WINTER.

	Mean Temp.	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm.	Maximum.	Minimum.	Diff.
Ice Fiord	—12.9	—3.3	—2.6	+1.1	+4.6	+8.8	+8.8	+8.3	+0.1	—3.9	SSW. +8.8	N. —3.3	12°.1
Bear Island	—13.2	—1.2	—1.8	—0.4	+3.8	+5.8	+7.6	+4.7	+0.3	+0.8	S. 25 W. +8.0	N. 20 E. —2.0	10.0
Tobiesen's Winter Quarters in Novaya Zemlya	—23.3	—4.5	—5.8	—3.4	+2.6	+3.7	+7.2	+6.5	+0.9	—5.4	S. 50 W. +8.9	NE. —5.8	14.7
Yakutsk	—38.2	—0.2	+3.2	+5.0	+3.3	+4.2	+4.0	+7.6	+3.0	—1.4	W. —7.6	N. —0.2	7.8
Nishne Kolymsk	—31.0	+1.3	+0.9	+4.7	+6.3	+5.0	+1.6	+2.0	+0.2	—3.0	E. 56 S. +6.5	W. 46 N. —0.1	6.6
Port Kennedy	—37.0	—0.2	+0.9	+1.6	+2.1	+3.2	+2.7	+0.3	—0.6	—2.5	E. 70 S. +3.5	W. 58 N. —0.8	4.3
Rensselaer Harbour	—35.0	+1.7	+1.4	+2.5	+2.6	+1.0	—0.4	+0.2	+0.9	—4.2	E. 50 S. +2.8	S. 60 W. —0.6	3.4
Godthaab	—10.0	—1.8	—2.4	—1.6	+2.3	+5.2	+3.5	0.0	—1.5	—	S. +5.2	NE. —2.4	7.6
Reikiavig	— 1.8	—3.6	—2.2	+1.3	+4.1	+3.7	+1.1	—1.4	—2.9	—	E. 68 S. +4.4	N. —3.6	8.0

SUMMER.

Bear Island	4.8	+0.2	—0.3	+0.4	+1.0	+1.3	+0.9	+0.2	+0.1	—	E. 75 S. +1.5	N. 50 E. —0.4	1°.9
Yakutsk	14.9	—1.4	+0.2	+0.8	+1.3	+1.5	+0.6	—1.1	—2.0	—	S. +1.5	NW. —2.0	3.5
Nishne Kolymsk	10.6	—0.3	+0.6	+0.2	0.0	+0.7	+1.4	—0.2	—0.8	—	SW. +1.4	W. 30 N. —1.0	2.4
Port Kennedy	3.1	—0.1	+0.1	+0.2	+0.5	+0.9	+0.3	—0.4	—1.0	—	S. 10 W. +1.3	W. 30 N. —1.3	2.6
Renssalaer Harbour	0.7	—0.3	—1.6	—0.9	—0.2	+0.1	+0.4	—1.0	—0.4	+1.2	S. 48 W. +0.6	N. 60 E. —1.7	2.3
Godthaab	4.8	+0.1	+0.3	0.0	+0.4	+0.2	+1.1	—0.8	—2.1	—	S. 50 W. +1.4	W. 40 N. —2.5	3.9
Reikiavig	11.0	0.0	+0.5	+0.1	+0.2	+0.3	—0.7	—1.0	—1.3	—	E. 30 S. +0.7	W. 35 N. —1.6	2.3

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Bibliography.

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HISTORY OF GEOGRAPHY.

SIEBERT (Dr. W.) die geographischen Entdeckungen u. Kolonisationen in unserem Jahrhundert u. unsere jetzige kenntniss der Erdsberflaecha. Vorlesung. 8vo., pp. 54. Kassel, 1874. 1s.

GRAVIER (G.) Découverte de l'Amérique par les Normands au Xe siècle. 8vo., pp. 290. Maps. Paris, 1874.

HARRISSE (H.) Les Colombo de France et d'Italie, fameux marins du XVe siècle, 1461-1492, d'après des documents nouveaux ou inédits tirés des archives de Milan, de Paris, et de Venise. 4to., pp. 140. Paris, 1874.

VARNHAGEN (F. A.) Ainda Amerige Vespucci: novos estudios e achegas. fol. pp. 8. Plate. Vienna, 1874. 4s. 6d.

HANDBOOKS.

CAPORALI (E.) Geografia enciclopedica rispondente al bisogno degl' italiani. 8vo., pp. 468. Milan, 1874.

REYT (M.) La géographie enseignée par le dessin, nouvelle méthode. 4to., pp. 396. Bordeaux, 1874.

UNGARELLI (L.) Corso elementare di geografia e statistica. Vol. I. 16mo., pp. 356. Bologna, 1874. 2s. 6d.)

SURVEYING AND PRODUCTION OF MAPS.

ESMONNOT (E.) Guide pratique pour les opérations de levé des plans (batiments—machines—topographie). Nivellement, lecture et détermination des courbes horizontales, &c. 8vo., pp. 199. Monlins, 1874. 2s.

SMITH, (R. S., U.S. Naval Academy, Annapolis) Manual of topographical drawing. Illustr. New ed. N. York, 1874. 10s.

CLEVENGER (Sh. V.) A treatise on the method of Government Surveying as prescribed by the United States Congress and Commissioner of the General Land Office, with instructions for the use of United States surveyors. 18mo., pp. 210. New York, 1874. 12s. 6d.

WACHTER (A.) Atlas élémentaire de topographie, précédé d'un vocabulaire topographique. 4to., pp. 16, and 40 plates. Paris, 1874.

BAUERNFEIND (C. M. von.) Besbachtungen und Untersuchungen über die Eigenschften. u. d. Verwerthung der Naudet'schen. Aneroïdbarometer. 4to., pp. 56. Munich, 1874. 2s. 3d.

PHYSICAL GEOGRAPHY.

DARWIN (Ch.) The structure and distribution of coral reefs. 2nd ed. revised. 8vo., pp. 290. London, 1874. 7s. 6d.

GIRARD (Jules) Les explorations sous-marines. Hydrographie, appareils de sondage, le sol sous-marin, la vie dans les profondeurs de la mer, les eaux, les mers anciennes. 8vo., pp. 256. Illustrated. Paris, 1874. 4s.

MELDRUM, Notes sur la forme les cyclones dans l'ocean indien, &c. 8vo., pp. 30. Maps. Paris, 1874. 1s. 3d.

ADHÉMAR (J.) Révolutions de la Mer. Déluges périodiques. 3rd ed. 8vo., pp. 366. Plates. Paris, 1874.

SCHLEIDEN (Dr. H.) Das Meer. 2nd ed. 28 steel plates, 300 woodcuts and map. pp. 752. Berlin, 1874. 34s.

ERMAN (A.) u. PETERSEN (H.) Die Grundlagen der Gaussischen Theorie u. d. Erscheinungen des Erdmagnetismus im f. 1829. 4to. pp. 44. Maps and Plates. Berlin, 1874. 6s.

SCHILLING (Capt. Baron N.) Die beständigen Strömungen in der Luft u. im Meere. 8vo., pp. 56. Berlin, 1874. 1s. 3d.

WORLD.

HÜBNER (A. von). Ein Spaziergang um die Welt. 2 vols. 8vo., pp. 830. Leipzig, 1874. 12s.

HÜBNER (A. di). Passeggiato intorno al mondo nel 1871. Turin, 1871.

BEHM (E.) and WAGNER (H.) Die Bevölkerung der Erde. Jährliche Uebersicht über neue Arealberechnungen, Zäplungen u. s. w. (Supplement, No. 35 of "Petermann's Mittheilungen".) Maps. 4to., pp. 110. Gotha, 1874. 5s.

EYRIES et JACOBS (A.) Voyage en Asie et en France, d'après les récits des derniers voyageurs. 8vo., pp. 700. Paris, 1874.

EUROPE.

COOK'S Tourist Handbook for Holland, Belgium, and the Rhine. 12mo., pp. 188. London, 1874. 2s. 6d.

OSBORNE (C. I.) A few pages from Real Life; or, a Guide Book from Notes of Impressions received from well-known places (Vienna, Constantinople, Athens, Rome, &c.). 2 vols. 8vo. London, 1874. 16s.

A SATCHELL GUIDE for the Vacation Tourist in Europe: a compact Itinerary of the British Isles, Belgium and Holland, Germany and the Rhine, Switzerland, France, Austria, and Italy. Maps. 12mo., pp. 360. London, 1874. 9s.

JANKE (Lieut. A.) Reise-Erinnerungen aus Italien, Griechenland u. d. Orient. 8vo., pp. 528. Berlin, 1874. 7s. 3d.

BRITISH ISLANDS.

MURRAY'S Handbook to the Cathedrals of England. Western Division (Gloucester, Hereford, Worcester, Bristol, Lichfield). New ed., pp. 346. London, 1874. 16s.

MURRAY'S Handbook for Travellers in Derbyshire, Nottinghamshire, Leicestershire, and Staffordshire. 2nd ed., pp. 266. London, 1874. 9s.

HANDBOOK and Appendix of all the Stations, Junctions, Sidings, &c., of the Railways in the United Kingdom; showing their exact position. New ed., 8vo. London, 1874. 3s.

SOME TIME IN IRELAND; a Recollection. 8vo., pp. 316. London, 1874. 7s. 6d.

SYMONS (G. J.) British Rainfall, 1873, at 1700 stations. Maps. 8vo., pp. 198. London, 1874. 5s.

FRANCE.

JOANNE (A.) Géographie du département de l'Aube. Map and illustration. 12mo., pp. 58. Paris, 1874. 9d.

JOANNE (A.) Géographie du département de la Loire. Map and illustrations. 12mo., pp. 66. Paris, 1874. 9d.

JOANNE (A.) Géographie du département de Seine-et-Oise. Map and Illustrations. 12mo., pp. 63. Paris, 1874. 9d.

TABLEAU général du commerce de la France avec ses colonies et les puissances étrangères, 1872. 4to., pp. 790. Paris, 1874.

LES nouveaux forts de Paris (loi du 27 Mars 1874), avec une carte par Erhard. 8vo., pp. 351. Paris, 1874.

ITALY.

MURRAY'S Handbook for Travellers in Northern Italy. 13th ed. Maps and Plans. 12mo., pp. 608. London, 1874. 10s.

ALTAVILLA (Prof. R.) Il Regno d'Italia. Dizionario geografico-storico-statistico ad uso di tutti. Turin, 1874. To be completed in 15 parts at 10d.

BUODO (P.) Estuario veneto. Fiume Po. Tre articoli. 8vo., pp. 32. Padua, 1874.

CALENDARIO generale del regno d'Italia, compilato per cura del Ministero dell' Interno. Anno XII. 8vo., pp. 1464. Rome, 1874.

Cartography.

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British Admiralty Charts.

THE number of Admiralty Charts published since the 1st of January is exceedingly small, and only few amongst them are distinguished by originality. The so-called Track Chart of the World* is, in fact, a Mercator's Chart of the world, with the interior of the continents fully delineated, and intended to be used for laying down the tracks of exploring vessels or other information. It is very neatly engraved; but we should have preferred it if the hills had been omitted altogether or engraved in a less obtrusive manner, for, as they are, they merely obscure the outline without conveying an adequate idea of the configuration of the ground. The indication of the principal mountain summits would have met every practical requirement. The chart of a portion of the East Coast of England† is based upon surveys made by Captain Hewett, in 1828, and, as far as the Wash is concerned, by Captain E. K. Calver and Lieutenants J. H. Ellis, G. A. Browning, and F. W. Jarrad, in 1871. The delay in the publication of this survey is much to be regretted, for it may easily be imagined that intricate

* 2558.—Track Chart of the World. London, 1874. 6s.

† 1455.—England, East Coast, sheet 4, from Cromer to Trusthorpe. Scale 1 : 36,500. London, 1874. 1s. 6d.

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channels and sand banks, such as are shown in this chart, are subject to change almost from year to year. The chart of Lough Carlingford* is a mere reproduction of Captain R. Hoskyn's survey (1857), with a few additions of no great importance to the general public, though not to be discarded by the mariner. The chart of a portion of the coast of Sweden† is based upon Swedish surveys, whilst that of Bavatoube or Dalrymple Bay (Madagascar)‡ is of French origin. The chart of the island of Amsterdam,§ in the Southern Indian Ocean, is based upon d'Entrecastaux's running survey (1792), supplemented by surveys made by order of Commander J. G. Goodenough in 1873. The island, according to the chart before us, has an area of about 17 square miles, and rises to an altitude of 2760 feet. The landing place near its north-eastern cape lies in latitude 37° 49′ S. and longitude 77° 33′ E. A supplementary chart, on a smaller scale, shows the relative positions of Amsterdam and St. Paul. The chart of the Gulf of Martaban‖ is based upon various surveys by British naval officers, whilst for that of Quiquik Bay and adjacent coasts¶ we are indebted to French surveys made in 1864. Australasia is represented by a chart of Port Lincoln,** from surveys made in 1872, by Staff-Commander F. Howard, and by a fine chart of the Akaroa Harbour of the Middle Island of New Zealand,†† surveyed as long ago as 1849-50, by Captain J. L. Stoker, Commander Richards and others. This delay in the publication of surveys is certainly much to be regretted, and we should think that if it arises merely from a desire of keeping within annual estimates, and not from a deficiency of engravers, it might easily be avoided.

Lastly, we have to notice the publication of four index charts‡‡ which facilitate reference to the publications of the Admiralty, and very usefully supplement the published catalogues.

Dutch Physical Atlas.

MR. N. W. POSTHUMUS, the Secretary to the Netherlands Geographical Society, and Dr. Kan of Utrecht, have published a school atlas of physical geography which is, in some respects, an improvement on those of Keith Johnston and Berghaus; while, by the use of the latest authorities, such as the results of the voyage of the 'Challenger,' and of Baron von Richthofen's travels in China, the work is brought up to date. The maps are well and judiciously drawn and coloured, to illustrate the earth's orography and hydrography, geology, the currents of the oceans, the winds, rainfall, distribution of plants and animals, ethnology, and religions. There are twenty-five maps, and the atlas is of convenient size, and admirably adapted for the purpose for which it is intended.

* 2800.—Ireland, East Coast:—Carlingford Lough with Newry River. Scale 1 : 104,300 and 20,860. London, 1874. 2s. 6d.

† 129.—Sweden:—Hönö to Paternosters, and approaches to Marstrand and Klädesholm. Scale 1 : 50,430. London, 1874. 1s. 6d.

‡ 707.—Madagascar:—Bavatoube or Dalrymple Bay. Scale 1 : 28,100. London, 1874. 1s. 6d.

§ 1945.—Indian Ocean: Amsterdam and St. Paul Islands. Scale 1 : 72,800 and 505,000. London, 1874. 1s.

‖ 823.—Bay of Bengal, East Coast:—Coronge Island to White Point, including the Gulf of Martaban. Scale 1 : 365,183. London, 1874. 3s.

¶ 1005.—Cochin China, East Coast:—Quiquik Bay and adjacent coasts. Scale 1 : 9,360. London, 1874. 1s. 6d.

** 784.—South Australia:—Port Lincoln, Spencer Gulf. Scale 1 : 36,500. London, 1874. 2s.

†† 1575.—New Zealand:—Akaroa Harbour, Middle Island. Scale 1 : 29,200. London, 1874. 1s. 6d.

‡‡ *(a.)* Index sheet for General Charts of the World. London, 1874. 6d.

(b.) Index sheet for England, Ireland and Channel Islands. London, 1874. 6d.

(c.) Index sheet for Scotland, &c. London, 1874. 6d.

(k.) Index sheet for South America. London, 1874. 6d.

Log Book.

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Henry Grinnell.—The first President of the American Geographical Society died at New York on the 30th of last June, at the advanced age of 75. Mr. Grinnell fitted out the first American Arctic Expedition in 1850, which co-operated with the English naval searchers after Sir John Franklin. This munificent act of sympathy with England was very warmly appreciated in this country, and the name of Grinnell has an honoured place in the memory of all English Arctic officers. Mr. Grinnell was for thirty years a member of the whale-ship firm of Grinnell, Minturn, and Co. It was one of his whalers which picked up the abandoned 'Resolute,' and Mr. Grinnell absolutely refused to accept his lawful share of the salvage. He always took a most lively interest in Arctic discovery, and one of the last occasions on which he attended a meeting of the American Geographical Society, was when the officers of the 'Polaris' were welcomed home.

Indian Marine Surveys.—Captain A. D. Taylor (late I. N.) will be the new Superintendent of Marine Surveys in India, to carry out the measures explained in the article in our last number; which have now received the sanction of the Secretary of State. Captain Taylor has come to England, in order to collect all existing materials that are likely to be useful in the execution of his work; and he will return to Calcutta in the course of the autumn, when it is hoped that the long neglected surveys of our Indian coasts will at length be resumed.

Travels of Mr. Cross in South America.—Mr. Robert Cross, the traveller who was employed by Mr. Markham on several occasions to collect chinchona seeds in Ecuador and New Granada, has returned from a fifth visit to South America; and intends to publish the results of his wanderings. His first trip was from the coast on the south side of the bay of Guayaquil, where he examined several ancient burial mounds, to the cordilleras of the province of Loxa. In the forests he discovered extensive ruins, consisting of stone walls and causeways scattered over the mountains for a space of 30 miles.

Mr. Cross afterwards landed at Buenaventura, the Pacific port of New Granada and, crossing the Cauca Valley, reached that of the Magdalena. He passed some time among the Paez Indians, near the headwaters of the Magdalena, an interesting aboriginal race of whom very little is known.

Direct Line of Steamers from Liverpool up the Amazon.—Last April the steamer 'Mallard' arrived at Manaos, on the Rio Negro, several hundred miles above the mouth of the Amazon. She left Liverpool on the 22nd of last March, and touched at Havre, Vigo, Lisbon, and Pará, leaving the latter place to ascend the river on the 24th of April. The people of Manaos joyfully welcomed this commencement of direct communication with their inland province from the other side of the Atlantic.

The Paraguay Survey.—Owing to a change in the administration, and to the general inefficiency of the executive, the scientific expedition to Paraguay has been broken up, and most of its members have

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returned. But Mr. Keith Johnston was too good a geographer to give up his aspirations after one disappointment. Resolved to achieve some useful work, he has joined the Argentine General, Vidal, who is exploring the Gran Chacu in the direction of Bolivia, with the object of settling the boundary question. We are confident that the young explorer—the bearer of a name so highly honoured among geographers—will not return without doing good service to a science, devotion to which is a tradition of his family.

New Granada.—The report of Señor Parra, the Secretary of the Interior at Bogota, for 1873, shows the revenue of the Republic of New Granada to amount to 800,000*l.*, of which sum 550,000*l.* are derived from customs. The value of the imports was 2,500,000*l.*, and of the exports 2,192,000*l.* The number of vessels which entered the ports of New Granada was 1010, measuring 361,156 tons, of which 281 were steamers. The coinage of gold and silver amounted to $533,671. Señor Parra refers to the introduction of chinchona cultivation into India as an example which the Neo-Granadinos should follow, with regard to many products of the old world which might be profitably cultivated in the valleys of the Magdalena and the Cauca.

Affairs on the Northern Frontier of Persia.—From Asterabad we learn that the Turkmen have of late shown themselves more amenable to the Persian authorities at that city, and have paid tribute without opposition, but that between the tribes themselves there have been bitter intestine quarrels, which recently culminated in a bloody inter-tribal conflict. In February last about 2000 families of the Goklan Turkmen, who had originally emigrated from the Khanate of Khiva, to avoid having to contribute to the Russian war indemnity, had come to settle in Karikala, a group of old dismantled forts on the Atrek. They had, however, been requested to retire within their old haunts between the Gurgan and Atrek, by the Governor of Bujnurd, who felt uneasy at their proximity, and there was every probability of their obeying quietly.

A rumour is gaining ground in Tehran that the Teke Turkmen intend invading Khorassan, and advancing against Khelat. The Persian Government has accordingly commenced operations for an expedition against them, and is considering a project for establishing a telegraphic line along the frontier, as far as Meshed, and so keeping a vigilant eye on the movements of the Turkmen.

Père David on the Population of China.—The well-known French Missionary in China, Père David, has made some interesting communications to the Paris Geographical Society on the subject of the population of China, which has been so much discussed. The Muhammadan rebellion has occasioned such ravages that, whether from wholesale massacre or from emigration, some provinces of Central China are actually reduced to a fifth of their previous population. But, nevertheless, Père David cannot agree with Baron Richthofen, who estimates the total population at no more than a hundred millions. A hut, which in Europe would only do to house a horse, a cow and her calf, serves in China to lodge several families, forming an aggregate of say from thirty to forty people. A better estimate can be formed by calculating the number of hamlets and villages to a *ton* or parish, the number of *tons* in a district or *chiene*, the number of *chienes* in a division or "riding" (called *fou*), and the number of *fous* in a province or *sen*, than by any calculation based on the superficial area. In Kiangsi, which Père David is acquainted with, and which he thinks may fairly be taken as an average province, the above calculation based on a postulate of four souls to a family, would give a total of 17,380,000 human beings. This would give for the eighteen provinces of China a population exceeding 300,000,000. It is certainly a fact that Chinese towns are often extremely scantily populated, but on the other hand the mountains are most densely inhabited. The Chinese marry young, and were it not for infanticide, occasional desertions, and the ravages of small-pox, the population would, doubtless, double itself in a score of years.

German Expedition for Observing the Transit of Venus.—The German corvette 'Gazelle,' Captain von Schleinitz, left Kiel on June 20th, with the members of one of the parties for observing the transit of Venus. The 'Gazelle' will first of all proceed to the Cape of Good Hope, following a track intermediate between that of the 'Challenger' and the coast of Africa. Having regulated the instruments at the Cape Observatory, it will visit the Crozet Islands, and then land the astronomical party on Kerguelen. Should the weather render astronomical observations impossible, it will take the astronomers at once to Mauritius, whence they will return to Europe. In the more favourable case, however, it will leave the astronomers for awhile to search for the warm current supposed to exist between longitude 68° and 80° E., and make an effort to reach Wilkes' Land. On returning to Kerguelen the astronomers will be taken to Mauritius, but the 'Gazelle' will visit the north-western coast of Australia, the coast of Guinea, and several inland groups of the Pacific, finally returning to Europe through Maghelaos Strait. The 'Gazelle' has been supplied with a complete set of instruments for deep-sea soundings and physical observations, and results of importance to science may be anticipated, even should the observation of the transit of Venus be rendered impossible. Germany will likewise despatch astronomical expeditions to Auckland, Chifu (China), Mauritius and Ispahan.

A New Sea-port for Rome.—Prince Torlonia has ceded a large tract of territory at Fiumicino and along the right arm of the Tiber for the purpose of creating a new sea-port, to be connected with Rome by a railway. Fiumicino is about 2 miles below Porto, the ancient Port of Trajan, and is intended to become with reference to modern Rome what Ostia, and at a subsequent period Portus, were to the ancient city. The skill of modern engineers is believed to be equal to re-opening the silted up mouths of the Tiber to the navies of the world.

A German Nautical Observatory (Seewarte).—A Bill has been prepared by the German Federal Council for the establishment of this institution at Hamburg. The observatory will be charged with the collection and publication of information concerning the geography of the sea, with making meteorological and astronomical observations, and the hoisting of storm-signals. Branch offices are to be established at the principal German sea-ports.

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Correspondence.

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KARA-KORUM.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In your last number (p. 167) Colonel Yule has attracted attention to a passage in my paper No. III. (*Geographical Magazine*, June, p. 113), in which, on the authority of D'Ohsson, I stated that Kara-Korum "by Muhammadan writers was called Ordu-Balik *or Belasagun*." When I quote from Veniukof or from any one else, I usually say so. The matter on Kara-Korum, as is evident in my paper, is an interpolation from Paderin himself, and I may as well observe here that my papers are not so much digests as reviews of Veniukof's work, and rather essays than either the one or the other, for I bring to bear upon him a mass of outside materials from various authorities who are in all cases alluded to by name.

With reference to the question suggested by my remark on Kara-Korum, I would point out that I distinctly name D'Ohsson (not D'Hosson, which was a misspelling) as the authority for my statement; the ambiguity is therefore not in my writing. Having given this explanation, I now proceed to admit that I was wrong in adding "or Belasagun," and that Colonel Yule, who is as much master of the geography of Asia as I am comparatively but a student in it, is perfectly correct in his doubts.

My error arose from quoting D'Ohsson at second-hand, and from adhering too faithfully to M. *de* Semënof, whom I mentioned by name in a line with the quotation. I had not D'Ohsson by me at the time, so that I could not verify either the reference or the fact as given by my Russian authority. Hence not alone my application to Kara-Korum of the alternative name of Belasagun,* but also the reference to the wrong page in D'Ohsson's work. Colonel Yule's surmise that Ritter is responsible for that application, is so far apparently correct, for as M. *de* Semënof himself gives the wrong page in D'Ohsson, and fathers upon the latter, as we shall see, a statement which is directly the reverse of what the latter does say, it is to be concluded that he, also, did not turn to D'Ohsson, and quoted him through Ritter.

The phrase as it occurs in M. *de* Semënof's Russian edition (vol. ii., pp. 264 to 265) of part of Ritter's Asia, is as follows:—

"Muhammadan writers call this ancient capital of the Turks [Korin or Kholin, or Kara-Korum] Ordu-Balig [*D'Ohsson Hist. des Mongols*, t. i., p. 76] or Belasagun [Balgassun], which is, however, only its title."†

I cannot at present refer to Remusat's *Recherches sur la ville de Kara-Korum* to see if this is borne out by that writer, but D'Ohsson in his note v. to p. iii. (not 76), see vol. i., p. 430, says, "Les Ouïgours croyent que leur nation habitait primitivement les bords du fleuve Orcoun [Orkhon], qui prend sa source dans les monts appelés Caracouroum, dont le nom a été donné à la ville récemment fondée par le Caan [Ogotai]." . . . . "Les Ouïgours établis sur les rives de l'Orcoun se divisèrent en deux nations, ... ils s'élurent un chef. Ce fut cinq cents ans après cette époque que parut Boucoukhan. On dit que ce prince est le même que celui qu'on nomme Efrassiyab. Il y a dans les monts Caracouroum une ancienne fosse qu'on dit être la fosse de Pijen, et l'on voit sur le bord de l'Orcoun les vestiges d'une ville et d'un palais, qui étaient jadis nommés Ordou-Balic, et qu'on appelle maintenant Maou-Balic."

Ordou-Balic, D'Ohsson explains, means the city of the Ordou* and Maou-Balic means bad city, or ruined city.

In the same note in D'Ohsson, it is said that the legendary "Boucoukhan" of miraculous birth (as described in an inscription on a stone tablet found in a pit in front of the palace above-mentioned, and which was taken to China and deciphered there, p. 431), built the city of Ordou-Balic on the banks of the "Orcoun," on the return from the west of his victorious armies with their numerous captives (p. 433).

As for Belasagun, I now find that D'Ohsson does not confound it, as M. *de* Semënof would have it, with Ordou-Balic, for on p. 433 D'Ohsson, quoting Muhammadan writers, says, Boucoukhan "marcha vers l'occident . . . . arrivé dans le Turkustan, il vit un belle plaine, bien arrosée, offrant de gras pâturages; il y établit sa résidence et y bâtit la ville de Béla-Sagoun,† qu'on appelle maintenant Gou-Balic. . . . Après avoir terminé ses grandes entreprises, Boucoukhan quitta sa résidence [Béla-Sagoun] pour retourner dans son pays natal."

D'Ohsson's note is composed of extracts from the "Tarikh Djihankuschaï," and from the "Djamiut-Tévarikh." I very much regret having been misled by the eminent Russian geographer; at the same time it is, perhaps, fortunate that I have, albeit unconsciously, led to the discovery of a geographical error in a Russian work of undoubted merit.

In his work on Mongolia (1828) Father Hyacinth says (note pp. 142 and 143) that Djynli-Khan, the chief of the Hoi-Hors (Ouigurs), A.D. 759 to 780, built the city called Khara-Khorin,‡ and Kara-Korum by the Turks, which Chingiz afterwards made his capital; Ugedei (Oktai) raised a wall round his capital, Khara-Khorin (p. 180). In 1369 (*sic.* in Hyacinth; Timkofski has it 1370) Ayur-Shiri-dara, son of Togan-Timur of the house of Tatan, removed his court from Dala (ai) Nor to Khorin (Part II., p. 195). On the map attached to this volume the site of Kara-Korum is not indicated, but on that attached to Hyacinth's *History of the Lives of the First Four Khans of the House of Chingiz*, the city is marked exactly where Colonel Yule would now have it,

* Colonel Yule at the end of his first note, p. 137 of your July number, notwithstanding his objection to this, would seem, from his wording, to give it the colour of his sanction.

† M. *de* Semënof devotes several pages to Kara-Korum, referring I believe to every existing authority on the point. Whether Paderin quotes "Chjan-de-Khoi," and others from the Russian translations or merely through M. *de* Semënof, I cannot say. The Siberian source, I may observe, is not easily, if at all, accessible in Europe.

* There is a note in D'Ohsson (vol. i., p. 83), explaining the meaning of Ordou, &c., which is evidently a transcript from Father Hyacinth, whose many learned remarks and elucidations seem to have passed, chiefly I should say, through Klaproth, into all subsequent works on Eastern Asia. Yet Klaproth, in more than one place, talks of the Father's ignorance and inaccuracies.

† Béla, or Bala, according to Father Hyacinth's list of historical names, taken from the Chinese dictionary of improved nomenclature, is a man's name, and means "to guard" (Sanscrit). Ba-la (Chinese). Béla or Bala-Sagun, Balgasun or Balgas*u* is, I find, a very common addition to names of places in Mongolia. Thus Father Hyacinth, quoting from "Han-mu," says, "The Mongol sovereign was then [at the time of the capture of Pekin by his cavalry] at Huan-Cheù," which, he explains on pages 76 and 80, is now known as Khurtun-*Balgasu* (*History of the First Four Khans of the House of Chingiz*, p. 80, in Russian). This is only one of many examples, and there is a Kara Balgasun in the pass between Urumtsi and Khamil.

‡ Khorin (Mongol), Kho'in (Chinese), means twenty. Kara corrupted into K*h*ara by the Chinese, means black, as everybody may know; but there were neighbouring tribes north of the "country of the three rivers" called the Khéré, and as Kara-Korum is also called Kéré-Kherin (*vide* Paderin), the name of that place and of the mountains may have been derived from the Khérés. This will accord with the system of nomenclature which prevails still among the tribes.

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and as he has located it on his sketch map in your July number; but Father Hyacinth on this map calls it Dalalakhu-Khara-Balgasu. This same name has been transferred to Petermann's little map of Western Mongolia (see *Mittheilungen*).

M. *de* Semënof, referring to Timkofski,* says that the situation of Kara-Korum, as indicated by the latter, and as shown on the *Carte du grand desert et des pays voisins, &c., Recherches*, "corresponds with the location of the place, unknown to us, however, called Talarkhé-Kara-Balgasun, 47° 32′ 24″ N. lat., and 13° 21′ 30″ W. long. of Peking, *i.e.* 100° 40′ 30″ E. long. of Paris, according to the determination of the Jesuits (Du Halde, ix., p. 615)."—*De* Semënof, vol. ii., pp. 200 and 201.

Balgasun applied to Kara-Korum must then have come from Father Hyacinth, who translated direct from Chinese histories, and not, as Colonel Yule presumes, from Ritter, who followed later.

In conclusion, I would suggest that Pijan, near Turfan, which is, too, situated near a lake, may be the ancient Balga-sun (*Balga* meaning "guarded refuge," and *Sun* being, perhaps, an objective case, and derived from *Su*, water), and that we may not unjustifiably connect the fable of the young Persian prince Pijen (*vide* D'Ohsson, p. 430, and note) with this place in Eastern Turkistan, to which "Boucoukhan's" Persian captives were brought, and from which he soon afterwards removed to his native country.

I would take this opportunity of correcting some misprints which occurred in my paper No. III., inserted in your June number. Read Raguzinski for Raguzinskia; on page 112, 1st column, line 15, read *from* Verkhné-Udinsk instead of *to*, and in line 16, read *to* instead of *on* the Kerulun; finally, in the last line of the 1st column, p. 112, the figure 47 indicates the number of miles which Soin-Noin is supposed to be distant from Kara-Korum, and, of course, not of degrees, as it is made to appear. With reference to the footnote p. 112, I had overlooked the fact that Mr. Ney Elias's map had been published in *Ocean Highways* for June 1873. In my last paper, p. 165, column 2, line 10, I should have said "between the Taranchis and the *remaining* Tungans.—Yours, &c.

ROBERT MICHELL.

HANDBOOK FOR TRAVELLERS IN NORWAY.†

ALL readers travelling or sporting on the Continent are likely to have applied more than once to those red cloth bound "Bradshaw's" or "Murray's," in order to get a precise and succinct information about what was to be seen or met with on their route. To the series of these useful handbooks, published in England or Germany, a Norwegian editor, the Consul-General Charles Tönsberg, at Christiania, has lately added a very instructive and practical traveller's handbook for Norway (*Norge, Illustreret Reisehaandbog*), whose alpine nature and picturesquely striking scenery are known to many of our readers we suppose. In directing their attention to this valuable publication, the text of which will be found to be as reliable and interesting as the wood-cuts and maps, we only wish to inform them that preparations have been made already for an edition of the book, adapted to English readers or travellers.

* Schott's edition.

† *Norge, Illustreret Reisehaandbog*. Udgivet af Chr. Tönsberg. Handbook for Travellers in Norway, with 112 Woodcuts and 17 Maps. Printed at Christiania, 1874. London: Trübner & Co., 57 & 59, Ludgate Hill.

Proceedings of Geographical Societies.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

AT the meeting of the 8th of May last, M. P. Semenof, Vice-President, being in the chair, the Secretary, M. Wilson, announced the departure of the Amu Daria Expedition under the command of Colonel Stoletof, and that the rival expedition charged with the duty of carrying a series of levels from the Caspian to the Aral had completed its preparations, and would commence work under the direction of Colonel Thilo, about the beginning of June. General Kaufmann had presented a valuable album of Khivan views and portraits, being a companion work to a similar one on Turkistan, which he had favoured the Society with about a year ago.

Letters had been received from M. Miklucho-Maklay, dated the 15th of February, from Amboina, and announcing his intention of repairing for the second time to New Guinea. He enclosed at the same time an essay in German on the Papuan language, and a pamphlet printed at Batavia, containing meteorological and other notes on New Guinea.

News had also been received from M. Chekanofsky, dated the 15th of February at Erbokhotchone, on the Lower Tunguska (North Siberia). Messrs. Chekanofsky and Muller had left Irkutsk on the 29th of last December, but for a month and a half had been occupied in making preparations for their journey to the Olenek River. During this interval, however, M. Muller had taken observations for latitude at several points along the Lower Tunguska. On the 16th of February, the travellers proposed to start for the sources of the Olenek, and to travel down the Tunguska as far as the confluence of the Great Tigliakit River (*circa* 60° N. latitude and 125° E. of Ferro); should, however, the snows prove too deep it might be necessary to go as far as the confluence of the Ukotcho or Kuakskugna tributaries, which do not appear on most maps. The petty merchants and Tunguses who frequent this region know the country well, and have been asked to lend their assistance to the expedition.

Many important results have been already achieved, but even after the Lower Tunguska and Olenek have been surveyed, a large tract of country within the Arctic circle and between the Lena and Yenisei will still remain unexplored. The courses of the Anabara and Khatanga Rivers, their distance from each other, the position of the estuary of the Yenisei (which varies as much as eight degrees on different maps!), and the position of lake Yesei, which is a place of resort for the Tunguses living on the Vilui, the Tunguska and the Yenisei, all require determination. The geological exploration of the banks of the Anabara and Khatanga, and of the bleak *tundras* between the Lena and Yenisei, would form an appropriate complement to the present labours on the Olenek and Tunguska, and Von Middendorf's work to the westward.

The above arguments have been strenuously urged by M. Schmidt (already known for his travels in the Lower Yenisei, see *Ocean Highways* for January, 1873, p. 324), and on his recommendation the Society has consented to prolong M. Chekanofsky's mission for another year, and granted him a sum of 3000 roubles for the purpose.

At its last meeting, the Council of the Society approved of Captain Prshevalsky's proposals with reference to the publication of his work on his recent travels in Mongolia.

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It will be entitled *Mongolia and the Tangut Country*, and will appear in three volumes. The first will be devoted to a description of the geography of the country traversed, a sketch of the people, and a narrative of the journey, and will be illustrated by a route-map drawn by Prshevalsky on the scale of 40 versts to an inch. The second volume will be taken up with remarks on the climate and the fauna, and with meteorological, hypsometrical, magnetical, and astronomical observations, while the third volume is to contain the botanical portion. Both the latter volumes will have numerous engravings. Several well-known names are to be associated with that of Prshevalsky in the production of this work, to which end the Society has lent a sum of 10,000 roubles, and three or four years is assigned for its completion. The first volume is, however, expected to appear towards the end of this year.

The completion of M. Rittich's ethnographical map of Russia in Europe was announced, as well as the intention of M. Bachmakof to hasten its publication by advancing a sum of 2000 roubles to the Society.

The meeting concluded with an account of a most interesting journey made by M. Pachino. This gentleman left Europe in the spring of last year, with the intention of traversing Hindustan and returning through Russian Turkistan. Although he was unable to carry out his scheme, he was able to advance far into the north-west, among the independent tribes north of Kashmir. From Ghilgit, this plucky traveller, disguised as a Hindu, had penetrated to Yassin, Amalsa, and Darkot, where poor Mr. Hayward was so brutally murdered. At the latter place he was recognised by an Affghan, who had met him some years before in Turkistan, and he was accordingly subjected to searching investigation before the local authorities. His thorough knowledge of Oriental languages and manners enabled him, fortunately, to disarm suspicion. After returning to Ghilgit, M. Pachino visited Lahor, Shikarpur, and Haidarabad, before setting homewards. His narrative is pleasantly interspersed with incidents of travel, and observations on the manners and customs of the numerous peoples of India, and a detailed description of his travels will appear in an early number of the *Bulletin*.

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FRENCH GEOGRAPHICAL SOCIETY.

Meeting of June the 17th, 1874.

THE Abbé DURAND, Assistant Secretary, read the minutes of the preceding meeting.

The Secretary of the Council, M. Ch. MAUNOIR gave a summary of the contents of the correspondence. M. N. Wyse had telegraphed from Tunis, that on the 11th of December last Dr. Nachtigal had written a letter from Wâra, reporting that the road towards Fûr was now open. M. Vivien de Saint-Martin had sent a note on the best road for Polar explorations.

The President of the Chamber of Commerce of Algiers informs the Society that M. Soleillet, having reached the oasis of In-Çâlah, has thereby shown the first halting-place for Algerian commerce in Central Africa, and that he had returned northwards with some inhabitants of Tuât. The Secretary of the Prefecture of Constantine announces that a sum of 2000 francs has been granted by the general Council of Constantine to M. Dournaux Dupéré, to defray the expense of his journey.

In the absence of the Abbé Armand David, M. Daubrée gave a summary of the last travels of the missionary, in some unknown portions of the interior of China. He began with the account of a hasty trip on the Tche-Kiang. M. David wanted to go to the Kokonoor for the prosecution of his studies in natural history. The Chinese ministers had refused his request for permission to visit the Shen-si province, then in the possession of the Muslims. His last journey lasted sixteen months and a half. He started from Peking for the province of Shen-si, and after travelling for thirty-two days, he reached the mountainous region, where he stayed five months and a half. Political reasons prevented him from going farther west. Abbé David continued his journey on the Han-Kiang, a tributary of the Yang-tze, 3860 *li* in length, where he was shipwrecked. The Han-Kiang, according to the observation of the zoologist-priest has a fall of 1 metre in every 6 kilometres. The second portion of the journey brought him into the provinces of Kiang-si and Fu-kian. Here he and his two servant-hunters suffered from ague, which delayed their further progress for a long time. He afterwards explored a cluster of mountains in a district very rich in natural productions, but again fell ill from ague and acute bronchitis.

Abbé David collected numerous geographical details. From Peking to the Se-tshuan, he travelled over an almost level plain. In the province of Shen-si he made very interesting geological observations on immense deposits of mud, and also on the important mountain range of Tsing-ling. He found carboniferous limestone in the mountains of Hang-Shan. He described the navigation on the Han-Kiang, and everywhere collected observations of the altitudes of places, and on their geology.

As to the population of the Chinese Empire, which Baron von Richthofen believes to be 100,000,000, the Abbé David thinks it is considerably above that number.

The Baron D'AVRIL communicated the news he had received from Colonel Gordon. A first letter, written in Khartoûm (15th of March), reported his arrival after a journey of eighteen days *viâ* Suez, Suakin, and Berber. It contains a description of the country and of the inhabitants. In another letter, dated the 17th of March, the Colonel speaks of the accumulation of vegetation on the Bahr-el-Zarâf, which formed the bars which stopped Sir Samuel Baker during eighteen months; and of the successful endeavours of the Egyptian Government, in cutting the bar. In consequence of that measure, an irruption of the waters followed, so violent, that hippopotami were carried away, and killed by contact with the steamers. The following letter, written on the road to Gondokoro (27th of March), contains a description of the animals living in the river. On reaching Gondokoro, Colonel Gordon wrote again (16th of April). He says that the navigation on the Bahr-el-Abiad had been very difficult, and would be very thankful to the French Geographical Society for aid by despatching a man who would explore the surrounding country. The difficulties of travelling have been exaggerated. He hopes to be in the Victoria Nyanza about October or November, and will proceed first to Mandara, a distance of twelve days' march.

M. H. DUVEYRIER read a note on the first portion of the journal of the French traveller, M. Dournaux Dupéré, from Tougourt to Ghadâmès, which he had received. He exhibited a sketch of that part of the route, which he had constructed according to the bearings and distances of M. Dournaux-Dupéré, on the scale of 1:400,000. M. Duveyrier expatiated upon the usefulness of the work and observations of M. Dournaux-Dupéré. In geography, he has already surveyed 130 kilometres of the lower part of the Igharghar, that large valley, formerly a river feeding the Bay of Triton, but which had remained dry for seventeen centuries. Now we know from M. Dournaux-Dupéré that an inundation took place some years ago. M. Duveyrier pointed out the great value of M. Dournaux-Dupéré's barometrical observations in those parts. He also read a letter from Dr. G. Schweinfurth, in which that traveller, before leaving Alexandria on his way home, gives an account of his work during his stay in the Libyan Desert.

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Meeting of July 3rd, 1874.

THE Abbé DURAND, Assistant Secretary, read the minutes of the last meeting.

The General Secretary, M. CHARLES MAUNOIR, informed the meeting that a telegram from the Emperor of Brazil had been received by the Society, on the occasion of the opening of telegraphic intercourse between Brazil and Europe. He also announced that intelligence had been received, although without confirmation, of the deaths of MM. Dournaux-Dupéré and Joubert, in the Sahara.

The General Secretary then read the following extracts from a letter which he had received from Major Wilson:—

"You will be pleased to hear that the surveys of nearly one-half of Palestine are now complete, and that the map has been drawn on the scale of one inch to an English mile, that is to say 1:63,360th; and, finally, that we hope to bring the operations to their conclusion during the winter of 1875-76, at which time the publication will begin.

"MM. Ganneau and Lecomte are doing good work. At Jerusalem and the environs they have made new and interesting discoveries, of which you will certainly have seen an account in the quarterly reports, which I trust our Secretary sends regularly to you.

"We have to deplore the death of Mr. Drake, who died a few days ago from ague caught in the valley of the Jordan."

In addition to the correspondence of the Society, Dr. HAMY said that M. Mariette Bey had announced his discovery of Egyptian inscriptions relating to the reign of Toutmes III. These would contain about 1000 geographical names of places scattered over a considerable extent of country, beginning with Armenia on the east, extending to Nubia southwards, and including the whole of the basin of the Mediterranean, such as they were known to Egyptians during the seventeenth century before our era.

M. HERTZ announced that the Commission for Commercial Geography would have an exhibition in Paris, at the same time as the Geographical Congress. This exhibition will comprise: first, books and maps for the teaching of geography; second, books and maps on new commercial routes; third, samples of the natural productions of distant countries; and fourth, samples of French products which are exported to foreign countries.

M. FERDINAND DE LESSEPS said that at a meeting of the Society held about a year ago, he had spoken on the subject of the junction of Russian and Indian railways. A Frenchman, M. Cottard, and an Englishman, were appointed to explore the country, each beginning his journey at one of the two extremities of the projected line. M. Cottard has gone to Moscow, and has suggested the adoption of a line passing through Kazan to Tashkend. The line passing by Orenburg is the strategic route; that passing by Yekatarinburg and through Siberia is the commercial route. At the close of this year the project will be prosecuted in the latter direction. Although at first it had been proposed to go to Samarkand, M. de Lesseps' son points out Kashgar and Yarkand as the best main stations on a line uniting Russia with India. The Government of India has permitted M. de Lesseps, jun., to examine all Indian maps, published or unpublished. It is his intention to explore another road, passing along the valley of the Djihûn, and leaving Afghanistan to the south. At present the young traveller must be in Kashmir, on his way to Yarkand, the recently constituted state under Ya'qûb Beg. M. de Lesseps alluded to some slight difficulties raised by the English Government against the journey of observation of his son; but since he had declared his intention of passing through the valley of Kashmir, no further objections were raised. In illustration of these difficulties he pointed out that Mr. Shaw, an English functionary, had been obliged to start in secret in order to reach Yarkand.

Recently M. de Lesseps has submitted to the Academy of Sciences the project of M. Roudaire to create a sea in the interior of Algeria. A commission has been appointed by the Academy to consider the project, and is open to receive advice on the subject. Officers of the staff will be sent into the Tunisian Sahara to construct an exact map of that country. M. de Lesseps gave some particulars of the mode of excavation pursued. In illustration of the change of climate which would follow in the Algerian Sahara, he pointed out that since the month of November 1869, when the bitter lakes in the Isthmus of Suez were filled with water, the climate of the isthmus had changed, rain falling there now.

M. DELAHAYE, a companion of M. Dupuis during his journey in Tong-king now submitted, in his name, a map, drawn from memory, of his travels in 1870-73, showing the course of the Red River or the Songhoï, also called Hong-kiang. He said that for want of necessary instruments he could not claim for the map the merit of great accuracy. From Mangao to the mouth of the river Songhoï the distance is 414 miles, and can be travelled over in ten or fourteen days. Last year M. Dupuis navigated on the river with boats freighted with arms, destined for an attack on Ta-li-fu in Yün-nan, the expedition of M. Garnier arriving some time afterwards. M. Delahaye was himself present at the capture of Hanoï, and heard of the seizure of the other towns. He is now about to publish a narrative of those events.

M. ANTOINE D'ABBADIE presented a complete copy of his *Géodésie d'Ethiopie*, a large quarto volume containing many maps, and said a few words explanatory of his system of geodesy. He began his operations at Mussawwa', on the Red Sea, where he arrived, and in the neighbourhood of which a range of mountains extends parallel with the sea. Before leaving that place he measured the direction of the range by means of the difference of azimuths with the sun. When in 'Adwa, he observed its latitude, and obtained the distance of the range by means of the time necessary for the transmission of sound. In Diksa also he observed the latitude; but as it would have been dangerous at that time to fire guns in order to deduce the difference of longitude from the length of time necessary for the transmission of sound, he established triangles by taking aims on the points he had already fixed on the map. One mountain he found to be higher than Mont Blanc. He pushed on his chain of azimuths as far as lake Tana and Gôndar, the longitudes of which were unknown at that time, and which he obtained by triangulation, finding it more exact than by astronomical observations. Rüppell's position of Gondar is incorrect on account of the unevenness of the country on the road thither, which lengthens the route by retarding the march. M. d'Abbadie gave very instructive hints on the way he ascertained the identity of a particular point when standing on the various stations by the concordance of his measures on that point. He examined the agreement of the results of height of longitude and latitude derived from the observations made at all the stations. His geodesic survey extended from Mussawwa' to Kaffa, an extent of country measuring as far as from Normandie to Spanish Navarra.

M. A. d'Abbadie then gave some particulars as to his measurement of heights. He calculated the heights of places according to the temperature at boiling point. He spoke of his experiments and of his small bases measured with the gun, and said that with a cannon one could measure a base 100 kilometres in length. Such was the true base of his map extending from Diksa to Mount Soloda. In recommending his method of geodesy to French travellers, he said it was used for the first time by a French officer, between Corsica and France in the year 1838; and, in conclusion, alluded to one incident of his long and adventurous travels in Ethiopia. He

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was stopped on the coast by the English, who wished to go before him into Inariya, and who afterwards denied that he had ever entered that country.

The President, M. DELESSE, on behalf of the Society, paid M. d'Abbadie a well-deserved meed of praise for his labours in Ethiopia, the geography of which he had now brought to a conclusion.

First General Meeting of the Committee of the International Congress for Geographical Science in Paris.

The several sections of the Committee of the International Geographical Congress to be held in Paris during the year 1875, assembled in the rooms of the Geographical Society, Rue Christine, on July 10th, 1874, for information respecting the progress of their preliminary labours. M. DELESSE, President of the Geographical Society, and of the Committee of Congress, was in the chair. In his address he explained the difficulties of the undertaking, and pointed out what had already been done, notwithstanding the work was but in its infancy.

Admiral DE LA RONCIERE LE NOURY, President of the Society, said that, after mature consideration, he thought the best place for the Congress to hold its session would be the new buildings of the Louvre, facing the banks of the Seine, and urged the necessity of fixing a date for the opening of the Congress. He proposed Easter Wednesday, the 31st of March, 1875, which date M. Delesse entirely approved.

M. HERTZ called attention to the project of the Economical Section of the Committee, which wishes to have, on the occasion of the Congress, an exhibition of commercial geography. He said that the new exhibition was not intended to compete with the Exhibition of the Productions of Algeria and the Colonies, to which last it would be afterwards annexed.

H. D.

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HAMBURG GEOGRAPHICAL SOCIETY.

WE have received the *Annual Journal of the Hamburg Geographical Society*, a young body to whom we most heartily wish success. The Society was founded on the 6th of March, 1873, and at the end of the month numbered 228 members, Dr. Kirchenpauer being President. There are not many men of purely scientific tastes in Hamburg, the great commercial city of Germany, but as geography is so intimately connected with trade and navigation, a Society having for one of its objects the diffusion of knowledge on that head, was sure to receive support and encouragement. The merchants of Hamburg and Altona have dealings with all parts of the world, and many of them have made arrangements for obtaining all available information of a geographical and scientific character from their numerous agents abroad. An instance of the way in which trade and exploration assist each other is afforded by the case of Dr. Lenz (to whom we have already alluded in our July number, p. 175), who will very shortly sail for the Ogowai, and explore that interesting and little known volcanic region east of the Gaboon. He will make as his base of operations the factory of Herr Woermann, a Hamburg merchant on the Gaboon. After completing his researches, Dr. Lenz will endeavour to effect a junction with the German African Expedition under Güssfeldt.

The Hamburg Society's meetings during the year under review (April 1873, to March 1874) were monthly. Among the various papers read two at least deserve notice.

ITALIANS ABROAD

Is the title of a paper read on the 5th of February last by Signor Cristofero Negri, the learned President of the Italian Geographical Society. The author began by sketching the rise of the Venetian Republic, her commercial energy, and her struggles with the Genoese Republic. At the conclusion of the war, Venice still swayed the Levant, but on the shores of the Black Sea, and along the inland routes to Persia, the Genoese held their ground. But the fall of Constantinople proved their death-blow, and though the Genoese struggled bravely against Turks and Tartars, one by one their forts, which had guarded the road to Central Asia, fell. The Venetians who had been driven out from the Red Sea by the Portuguese and Turks, took to sending embassies to Poland, Russia, and Persia, with the object of forming treaties against the Turks. The accounts of these embassies, as well as of the missions to the Mongol princes, were not so well known as they deserved to be, and still lay buried among the Italian archives. As a proof of the extended commercial relations of the Italians, it may be mentioned that a short time back documents were discovered in the *Bibliotheca Riccardiana* proving that before Marco Polo's time a Florentine house of the name of Peruggi had regular agents in Peking. Accounts have been discovered of the mission of Florentines along the land route to India, with the object of securing a portion of the Indian traffic in diamonds and precious stones for Italy. Though the Venetian records suffered disastrously by fire, yet undoubtedly great treasures of historical geography lie in the libraries of Genoa and Pisa, as well as in the Anjou and Aragon archives of Naples and Palermo.

The question of Italian emigration and colonization at the present day, Signor Negri averred, was one which could not but possess interest for any one who had read these national records of former days. In 1849 Signor Negri took great pains to ascertain statistics of emigration through the consulates, but without success, no states except Sardinia possessing any suitable organization for the purpose. There was in fact little emigration, and that mostly from Sardinia. But in the course of years this increased, and the extension of consular agencies over the whole world enabled Signor Negri to make successful enquiries. From a mass of official and private replies to his queries, he arrived at the conclusion that the Italians settled abroad number between 400,000 and 500,000, and that about 40,000 yearly set sail from home or foreign parts. The greatest emigration takes place from Liguria, the Abruzzi, from some valleys of Piedmont, Upper Lombardy, Parma and the Basilicate. The stream flows mainly to La Plata, where they do well as sailors, fishermen and peasants. About 4000 gain their livelihood on the boards of theatres, and earn an aggregate annual income of about 20 million francs or £800,000. Scarcely one-seventh ever return home, but nevertheless from 3 to 4 million francs (£120,000 to £160,000) is yearly remitted home by them towards the support of their relations. On the west coast of America Italy possesses about a hundred craft, and no less than a thousand are engaged in inland navigation in South America. Much has been done of late years to protect the interests of Italian colonists abroad, and the effect has been to strengthen the ties between the mother-country and her children. There are remarkably few Italians in Russia (St. Petersburg alone excepted, where a small colony has existed since the time of Catherine II.), but it is probable that in the time of the Brothers Zeni, and in the days when Fioravante built in Moscow and girdled her with walls, the number was much larger. In Russian Poland the number is equally small, but in Odessa, Kertch, and along the shores of the Black Sea there has been, since the days of the first Napoleon, a thriving colony, who lived by coral fishing, and employed 2500 craft in the trade.

Along the shores of the Adriatic, Italians are of course to be found in great numbers, while in other parts of Austro-Hungary they amount to about 10,000. In Germany there are about 1400 only, and in Great Britain, spite of a small colony in London, the total num-

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ber does not exceed 3000; but in France the number is as high as 90,000. In former times Spain and Portugal boasted a large number of Italian residents, but they have disappeared almost wholly from the latter place, and in the former they are restricted chiefly to Barcelona, Valencia, Malaga, Cadiz, and Seville, and barely exceed a thousand. In Gibraltar and Malta they form a large proportion of the entire population; in Patras there are a few settled as merchants, and in Athens a few as sculptors and architects. They muster very strong in Constantinople, Smyrna, and other Turkish towns. About 20,000 reside in Egypt and 10,000 in Tunis, making a total of 70,000 for the Ottoman Empire. Many too, have achieved distinction in Egypt; Brocchi, the geologist; Belzoni, well known for his antiquarian researches; Solucci Bey, the author of a great system of sanitary measures throughout Egypt; and Muzzi Bey, founder of the postal service. In Cyprus, the United States Consul-General Palma di Cesnola is a native of Turin, and is eminently versed in Assyrian, Greek and Roman antiquities.

Turning to Africa we find that the Italian colonies in Tripolitania hail chiefly from Tuscany; Catholic missions go thence as far south as lake Chad, one has lately been established in Western Sudan, while Padre Beltrame, known for his vocabulary of the Bari language, belonged to a mission in the Eastern Sudan. There are 8000 Italians in Algiers, the residue of a former emigration, but some of these who live by coral fishing are now suffering from some vexatious restrictions lately placed on this branch of industry. Marocco, Tangiers, and the Cape boast very few, but at some points along the Red Sea and in the Bogos country, it has more than once been proposed to establish trading or penal stations, in spite of Signor Negri's vigorous remonstrances. Apart from a few hundred missionaries in Persia, Bengal, Burma and China, there are no resident Italians in Asia to speak of. In Japan the number has increased, owing to the important trade in silkworms' eggs, which brings into Italy a profit of from 8 to 12 million francs per annum. About twenty years ago there was barely a single Italian vessel to be seen in East Indian waters, but now hundreds arrive in the course of the year. In Melbourne there are a very few Italian settlers, and a few scattered missionaries are to be found in other parts of Australia, in Tasmania, New Zealand, and Polynesia.

The United States boast about 70,000 Italians, who are chiefly to be found in Philadelphia, New York, Boston, Cincinnati, Chicago and New Orleans, while California owns about 10,000; all these come for the most part from South Italy. Constantino Beltrame, it will be remembered, discovered the sources of the Mississippi. Fewer in number are those in Mexico and the five Central American republics, but among them rank the names of Floresi and Moro, well known for their schemes of communication across the isthmi of Panama and Tehuantepec. In the West India Islands, in Northern Brazil, and in the harbours of Columbia, Venezuela and the Equator, there are a few scattered Italians; among these, Colonel Codazzi is known for his exploration of Venezuela. They are so plentiful in South Brazil, Uruguay, and the Argentine Republic, that there is a talk of this region proving eventually an Italian America; one-third of the entire population (84,000) of Buenos Ayres, and the whole of that of Rosario, consists of Italians, while a few colonies have been formed at the mouths of some of the Patagonian rivers. There are but a few in Chili and Bolivia, but in Peru they muster about 14,000 in number, Professor Raimondi being conspicuous among them for his geographical attainments.

Comparing them with the Germans, we find the latter predominant in the north of Europe, in Asia, America, the interior of Russia, in Poland, Austro-Hungary, Great Britain, the Netherlands, Belgium, the West Indies, South Africa, Australia, Polynesia, the East Indies, China, and the Amur region. In the Eastern and Central States of America the Germans are twenty times as numerous as the Italians, while in California this disparity partly disappears. In Mexico, Central America, Columbia and North Brazil, Italians rival Germans in numbers, while in South Brazil, Chili, Peru, and La Plata, as well as along the Mediterranean and Black Sea coasts they outnumber them.

Emigration from Italy is, in point of numbers, about a quarter of that of Germany, but it is increasing yearly. Half of the emigrants are mountaineers and hardy peasants, who only speak a sort of *patois*, and are almost wholly destitute of means. The prohibition of emigration, so as to supply recruits for the army, has been talked of, but never put into practice. Emigrant ships are subject, as in Germany, to certain regulations, affecting their provisioning and against over-loading; but these, unfortunately, are not strictly acted upon. Italy has concluded treaties of trade and navigation with every power of consequence, with the exception of Zanzibar, Muskat, and Bolivia, and with most states there are consular conventions which prescribe a certain sphere of action to the agents. About 100 consulates are provided with Italian officers, all of whom are well versed in legal experience, those in the Levant, according to Signor Negri, ranking higher in this respect than those of other countries.

Italian navigation is small, but increasing. During the year 1873, 10 Italian vessels arrived in the St. Lawrence River, 421 in New York, 200 visited Buenos Ayres, 100 sailed up the Parana, 200 anchored in East Indian waters, and 65 entered up the Elbe and Weser, but in St. Petersburg the number did not exceed 17. There is a weekly newspaper published in Rome, called *Il Giornale delle Colonie, Organo degli interessi Italiani all'estero*, which, as its name implies, deals with Italian interests abroad.

Signor Negri considers that though Hamburg is closely connected with German colonies abroad, and though all the material for a colonial parliament, should such a project be thought of, exists there, the rest of the German empire does not care to interest itself in the welfare of its children. No census of Germans living out of Europe appears ever to have been made, or any systematic inquiries respecting their condition, prosperity, and mode of obtaining a livelihood set on foot. No register of the deaths are kept in the consular agencies, and no subscriptions of any consequence appear to have been made on behalf of their wounded countrymen in the late war by German colonists. There is no other nation, in Signor Negri's opinion, not even the English, which makes such strides in geographical exploration; but in all their descriptions of travels, statistical maps, &c., we look in vain for a reference to their brethren living at a distance from the mother country. The achievements of a Nachtigall, a Brenner, a Von Richthofen, in the path of discovery, make it most desirable that either a private or public scheme should be set on foot with the object of strengthening the bonds between the mother country and her children abroad.

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THE DUTCH GEOGRAPHICAL SOCIETY.

WE have received the second number of the *Tijdschrift van het Aardrijkskundig Genootschap*, which shows how firmly rooted the Dutch Society has already become; and that good fruit may be expected from it. The number of members is increasing, and the finances of the Society are in a most flourishing condition. The present number contains an account of the proceedings of the meetings on the 28th of February and the 11th of April, the former held at the Hague, and the second at Amsterdam; at both of which Prince Henry of the Netherlands presided. The proceedings

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of the February meeting opened with a paper on New Guinea, by Herr P. J. B. C. Robidé van der Aa, in which he showed how little is yet known of this remarkable island, and how much of that little is due to the enterprise of the early Dutch navigators. In the discussion which followed the reading of the paper, Herr A. D. van der Gon Netscher gave some account of his voyage to the coast of New Guinea in the ship 'Diana,' in the year 1836; and of his ascent, for some miles, of a river which empties itself into Triton Bay. Then followed an important paper by Dr. D. J. Steyn Parvé, on geography as a branch of study at the Universities. In the subsequent discussion, Dr. Kan and other speakers expressed their full concurrence in the views of the author of the paper.

The second meeting of the year (the fourth since the inauguration of the Society) took place at Amsterdam; when Price Henry was in the chair. The Secretary read a report on the finances of the Society; after which Herr N. W. Posthumus gave a short account of the life and character of Miss Tinné, and of the results of her travels. Prince Henry exhibited a photograph of this adventurous lady. Dr. C. M. Kan then read a letter, just received from Berlin, from Dr. Koner, the Secretary of the African Association, giving a brief account of the progress of the German Congo Expedition. Dr. Güssfeldt had ascended the Quillo River to the last Dutch factory, and penetrated into the district of Yangela, which is the commencement of a mountainous region. The proceedings closed with a paper by Herr Veth on the increase of geographical knowledge, especially during the past year. In the course of his remarks he paid a just tribute to the memory of Maury, and expressed a hope that a suitable monument to this great benefactor of the seamen of all nations might be erected, in the shape of a lighthouse on the coast of Brazil. Herr Veth also noticed the labours of Livingstone and Garnier. In reviewing the publications which have for their object the diffusion of geographical knowledge, the eminent Dutch *savant* mentioned, with generous appreciation, the *Geographical Magazine*, Signor Guido Cora's *Kosmos*, and Petermann's *Mittheilungen*. He justly praised the beauty of the maps which illustrate Signor Cora's publication.

The *Tijdschrift* contains the papers of Dr. Steyn Parvé and Herr Veth in full; and an address to the Home Minister, signed by Herren Veth and Kan on the part of the Geographical Society, urging the importance of making geography a branch of study at the universities. There is also a detailed notice of Francis Garnier; and a historical and topographical account of the Dutch West Indian Island of St. Eustathius, illustrated by a carefully executed map.

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MEXICAN GEOGRAPHICAL SOCIETY.

A NEW series of the publications of the Mexican Geographical and Statistical Society was commenced from January 1873, and with it the labours of the Society have been extended and rendered more efficient. Indeed, the Society has become a very important national institution, and bids fair to be a prolific source whence useful suggestions for administrative action will emanate. The Minister of "Fomento" is now *ex officio* President; and there are branch committees in the capitals of all the States of the Federation. The new energy which has been infused into the Society is due to the learned Vice-President Don Ignacio Ramirez, and to the able and accomplished Secretary Don Ignacio Altamiraus. Meetings now take place every week during the session and the proceedings of the Society are published on the 2nd of each month. They are in octavo form, instead of the quarto shape of the old series, in order to facilitate transmission to Europe, and each issue contains sixty-four pages besides maps and other illustrations. The proceedings of the meetings are given (a new feature), as well as original communications and translations. The latter keep Mexican geographers informed of what is being done by their fellow labourers in other parts of the world. Thus the papers and reports on Dr. Livingstone's discoveries are translated from the *Proceedings of the Royal Geographical Society*, the account of the Upper Amazon, by the Abbé Durand, from the French *Bulletin*, and a sketch of recent Arctic discoveries from other sources.

The issues for 1873 also contain several original papers of great value. There is one on the State of Mexico, which is arranged on a plan similar to that adopted for the Administration Reports of the Indian Local Governments. It comprises much well digested statistical information, systematically arranged; and it is intended to organise a scheme by which similar information shall be collected and classified, from the other States of the Mexican Federation. Another paper is on the great importance of forest conservancy, by Don Manuel Balbontin, and a plan has been elaborated for making a complete collection of Mexican woods, with a view to the conservancy of the trees yielding those which are most useful. Each specimen is to be accompanied by a botanical identification, native name, account of the habitat, and of the local uses. There were other papers, during 1873, on agricultural and mining subjects; and an elaborate scheme for the classification of mining statistics.

One custom of the Mexican Geographical Society is to have an annual solemn celebration in honour of some departed worthy. In 1872 there was a meeting of this kind, at which Don Sebastian Lerdo de Fejada, the President of the Republic, took the chair, in memory of Professor Samuel Morse, the American inventor of the electric telegraph. The number of the *Proceedings* which records it contains a portrait of Professor Morse, an obituary address by the Secretary, a poem, and a detailed report on the telegraphic lines in the Mexican Republic, with a very creditable illustrative map. In 1873 the same honours were shown to the memory of Copernicus, when a discourse was delivered by Señor Romero, which is published in the *Proceedings*, with a portrait.

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THE

GEOGRAPHICAL MAGAZINE.

SEPTEMBER, 1874.

THE ROUTES TO THE NORTH POLAR REGION.*

THE recent return of the American Expedition under Captain Hall, and the addition of another 120 miles to our knowledge of the great unknown area round the North Pole by way of Baffin's Strait and Smith's Sound, adds remarkable confirmatory evidence of the value of that route, as the right one for the resumption of British Arctic discovery, and shows how wise and sound were the conclusions arrived at by the Committees of the Royal Society and the Royal Geographical Society in urging on our Government during the last two years the sending forth of an Arctic expedition up the remarkable series of straits which extend between Greenland and the American Arctic Archipelago.

Before recapitulating, from the memorandum drawn up by those two Societies, the scientific results likely to accrue from such an expedition, and their reasons for recommending the route in question, let me call the attention of this section of the British Association to the salient geographical features of that portion of the Arctic zone which lies northward of the American continent. I have, in a paper read before the Royal Geographical Society, in April 1873, shown, that whereas the three great continents of America, Asia, and Europe, all terminate in about the 70th parallel of latitude, leaving a vast crater in the earth's surface of about 2400 miles in diameter, there are two points at which that great area is bridged across by lands projected from the Asiatic and American continents at Grinnell Land—longitude, 70° W.; and Cape Taimyr—longitude, 105° E., until the intervening space is only 1080 miles wide, whereas a line across the Pole from Spitzbergen to Behring's Straits, at right angles to it, would be 1800 miles. Therefore it is clear that an expedition starting from the head of Smith's Channel across the Pole to the nearest known point of Asia, would have about 800 miles less unknown ground to traverse than one from Spitzbergen across the Pole to the American shore at Behring's Straits. This is one of my main reasons for having continuously adhered to the Smith Sound route as the right one for the exploration of the Polar area.

Another remarkable feature is as follows:—It appears, on looking at the circumpolar chart, that although the three continents terminate, as I have before said, in the 70th parallel, they each throw off to the northward great outlying groups of islands. Europe has its Spitzbergen group, which has now been thoroughly explored, and its scientific features nigh exhausted; and we know from Parry's remarkable boat journey, 120 miles north of it, that in remarkably clear weather no lands were seen to the northward, and it may, therefore, be fairly concluded that the European Arctic archipelago terminates there.

Asia has doubtless, in the Liakov group and Wrangel or Kellett's Lands, its Arctic archipelago, but as yet not traced nearer than 15 degrees of the Pole.

Turn now to the Western hemisphere, and note that from Greenland to Bank's Land, over 100 degrees of longitude, there is a great series of lands which have been traced from the 70th parallel up to the 84th, or within 360 miles of the Pole itself, and with no symptom of its termination there.

Greenland itself, on the western side, has been visited by Hall's Expedition up to latitude 83°, and found abounding in a remarkable degree with animal life; and, on its eastern shore, the German Expedition under Captain Koldewey, in 1870, wintered in 75° N., traced the land to 77°, and shot as many reindeer and musk oxen as they wished.

There can, therefore, be no question that of the three Arctic archipelagos the most extensive, the most worthy of exploration, the best in its resources and climate, and the one nearest to the Pole, is the American one, in which I comprise Greenland. To that portion of the Arctic Regions I now direct your attention. One of its most singular features is the remarkable manner in which it is divided or cut up by deep water channels running in generally north and south, and east and west directions, forming a series of straits unparalleled for length on any other portion of the globe. The longest of these, and the most remarkable, is the one which extends along the west side of Greenland. This long strait bears in different parts the names of its various discoverers, since John Davis entered it in 1587, and Baffin, in 1616, sighted and named Smith Sound, up which the American expeditions of Kane and Hall since 1860 have carried it, as I before said, to the 84th parallel. This strait is, therefore, known to be nearly 1600 miles long—the longest, certainly, as yet known amongst straits, but there are many others here nearly as remarkable. That from the bottom of the Gulf of Boothia to the head of Wellington Channel is fully 700 miles long; and we have besides three other straits traversing this archipelago in an east and west direction, almost

* Read at the Geographical Section of the British Association at Belfast, August 1874.

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parallel to each other, known under the general terms of Dolphin and Union Strait, Barrow Strait, and Jones' Strait, two of which are each 800 miles, and one 550 miles in length.

There is one feature connected with these straits, which run in a northerly direction, notably the Wellington and Baffin Straits, that down them there is a constant southerly motion of ice, as well verified by the long drifts made down them into the Atlantic Ocean, by four or five different expeditions that have been beset in the ice. Ross in 1849, De Haven in 1851, Kellett in 1854, McClintock in 1860, and, lastly, the crew of Hall's vessel, who drifted on a mass of ice from Smith Sound down to the coast of Labrador. These drifts from north to south testify to the fact that all these channels are open to the north into some great Polar Ocean, whence these ice-bearing currents issue.

It is this law of the southerly outpour of the ice formed within the Polar Regions, through these great straits, and its continuous character summer and winter, which has always been the difficulty in the way of Arctic exploration. There is no outlet for it except into the Atlantic; the Behring's Strait outlet into the Pacific is too shallow, and too narrow to be considered in the general question. It is on either side of Greenland that the true outpour of that enormous area of ice takes place; and the explorer who has to penetrate to the Pole against this ice current must seek for land to carry him up to such a position that he shall reach, during summer, the water space, if any, at the Pole, from whence the summer heats have caused the ice to flow.

In the broad channel between Spitzbergen and Greenland the major outflow of this ice takes place. The Spitzbergen shores terminating in 80°, every attempt to stretch northward in that direction, extending over a hundred years, has failed utterly; and the theory that between Spitzbergen and Novaya Zemlya, a water channel will be found to the Pole, is a pure hypothesis, founded on no fact, and totally at variance with all experience.

On the western side of this great outlet between Greenland and Spitzbergen, the East Coast of Greenland, if followed up, offers at first sight a means whereby the explorer might advance. English navigators repeatedly attempted it, but found the outpour of ice so heavy, so continuous, and impinging so much upon the coast, that up to 1823 no one had advanced beyond Shannon Island, and that route was declared by us impracticable.

In 1868, however, Dr. Augustus Petermann of Gotha, having special theories of his own which set aside the long experience of British Arctic navigators, persuaded his German countrymen that the East Coast of Greenland was the right route for the exploration of the Polar area. The result was that, in 1869-70, an expedition, composed of two ships, the 'Germania' and 'Hansa,' set forth, under Captain Koldewey, on this ill-judged purpose. It has been long known to us how they failed, in spite of the most gallant endeavours and the heroic sufferings of all concerned, and how Dr. Petermann, having tested the fallacy of one of his theories, clings obstinately to the other, that an expedition should be sent between Spitzbergen and Novaya Zemlya, a work taken up by the Austrians under the command of a military officer named Payer, one of Koldewey's associates. Payer's expedition is of course now missing, rewards have been offered for the discovery of his whereabouts, and an Englishman has started, aided by the liberal purse of our gallant associate Mr. Leigh Smith, to try to rescue him.

The labours of the Koldewey Expedition have never been sufficiently appreciated in this country; but I am happy to believe that when the excellent translation of the "German Arctic Expedition" of 1869-70 is published, next October, by the spirited publishers Messrs. Sampson Low & Co., under the able editorship of Mr. Bates, that we shall better understand how well Koldewey and his companions laboured to carry out Dr. Petermann's impracticable theory, and that they were merely foiled by the same difficulties which our seamen had found insurmountable. I have read the proof sheets of this remarkable work, and can safely aver that in the long record of Arctic discovery and heroism in that cause, nothing can exceed the sufferings of the crew of the 'Hansa,' who, after their vessel was smashed in the ice, lived on a drifting ice-floe through a long winter of 200 days, and drifted some 600 miles down the whole coast of East Greenland.

Koldewey himself, in the 'Germania,' wintered where Clavering and Sabine did in 1823, and added this information to our knowledge of Greenland—that the coast-line was continuous to 77° N.; that a short way in the interior the climate and vegetation improved remarkably; and that animal life, in the form of bears, seals, walrus, musk oxen, and reindeer was singularly plentiful.

Koldewey, the leader of this expedition, on his return recorded his opinion that he had been radically cured by his winter experiences on the East Greenland route of any belief in Dr. Petermann's theories, and says, to use his own words: "If the principal object (of an expedition) be the nearest possible approach to the Pole, I am quite of Osborn's opinion that the best way appears to be through Smith's Sound. Here one can penetrate by ship every year to the 78th parallel, and then one has a continuous line of coast running north, which has been sighted as far as the 82nd parallel. Along this coast one would have to work one's way in spring with dog-sledges. *I consider it a wild undertaking to penetrate towards the Pole by ship between Spitzbergen and Novaya Zemlya.*"

We will now turn our attention to Baffin's and Smith's Straits. The various names which dot this remarkable channel denote pretty clearly the arduous labours of explorers over three centuries of time. In 1585 Davis appears to have reached as far as the modern Danish settlement of Upernivik, and named a headland there after his patron, Sanderson, a wealthy London merchant.

Then came Baffin, in 1616, and in his little barque 'Discoverer' sailed round what was then thought to be a berg, and discovered not only the entrance to Barrow's Straits, which subsequent British navigators have found to lead to the Pacific Ocean, but he also laid down the entrance of Smith's Sound about 79° N., which American navigators in our time have gallantly shown is the true route to the great unknown region round our northern Pole. My lamented friend Dr. Kane was the first, with true genius, to grasp the idea, and, in 1855, in a small vessel hardly better fitted for Arctic discovery than Baffin's craft of 200 years before,

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pushed into this strait some 90 miles, and laid it open to human knowledge, about 150 miles in all, or to latitude 80° 40′ N. Astonished at the amount of navigable water he found, and the abundance of proofs that he was approaching instead of receding from an open sea, he, with pardonable enthusiasm, returned home, after suffering incredible hardships (owing to imperfect equipment), and reported, what was no doubt his belief, that he had seen, though he had not reached, an open Polar sea. Prior to his death I had frequent opportunities of conversing with him on the subject, and he fully made me a believer, to a certain extent, in his theory that Smith's Sound was the real route to the North Pole, though I saw many reasons for believing that the lands he had visited were continuous far beyond points seen, and that theory I committed myself to as far back as 1865, in a paper communicated to the Royal Geographical Society, and urged that we should take up the clue and secure to British seamen the honour of Polar discovery, as we had already done the exploration of the other great geographical problem, the North-West Passage.

The Americans, fired by the Arctic achievements of Kane, sent out soon after his return another expedition under Dr. Hayes. He, however, did but little beyond confirming much of Kane's report, and bringing proofs that within a few miles of where Kane wintered and nearly starved, he had found abundance of game and food.

The next American who attempted Smith's Sound was Captain Hall, who, having acclimatized himself by spending five winters amongst the Esquimaux of Davis Straits, devoted himself to the discovery of the Pole. The United States Congress voted him $50,000, and the American Geographical Society, New York, still further assisted him; but beyond great personal energy and enthusiasm, Captain Hall possessed but few qualifications to fit him for the serious task he had embarked in, and his vessel, the 'Polaris,' was as ill-fitted for his purpose as his companions were ill-assorted. After various mishaps in starting, he left the Danish settlement in Greenland finally in August 1871, and almost without a check from ice, reached some 120 miles further up Smith's Sound than ever Dr. Kane had seen, or to latitude 82° 16′ N. Here the 'Polaris' first encountered ice, and Hall's sailing captain, a man evidently possessing no qualification for the post, immediately induced Hall to take shelter at the nearest anchorage, despite, as the published evidence shows, of the opinion of all his officers. Captain Hall died suddenly in the autumn of 1871. The expedition became at his death utterly disorganized, and nothing further was done in 1872, although the prospect of further progress was most encouraging. The results, however, of the 'Polaris's' voyage may be briefly summed up: the shores of this remarkable strait, varying from 40 to 100 miles in width, were seen extending as far as eye could reach, and in a published chart, to which the American official seal has been attached, now in our Admiralty office, the 'Polaris' is credited with having discovered lands to 84° N. The eastern shore was found abounding in animal life; the climate declared to be milder than further south; the vegetation more abundant; the ice of the sea comparatively open; sea-birds numerous; a tidal action from the north perceptible; and every indication of more open water to the north.* Here we have positive information of a region actually visited in 82° N., or only 480 miles from the Pole, of a most encouraging character, and the explorers report that they saw lands of a similar character to those they were upon, extending to the 84th parallel, which is only 360 miles from the Pole.

I am stating an Arctic axiom, that wherever a navigator has seen lands and returned without visiting them, a subsequent expedition has always succeeded in reaching them; and I cannot be charged with being rash in asserting that whatever the latitude seen into by the crew of the 'Polaris,' a new expedition will assuredly reach, if not pass it; and assuming that a properly equipped British expedition goes in 1875, I have no doubt of its attaining latitude 84° at the least. If so, with our knowledge of Arctic boat and sledge work, of which the American expedition was totally ignorant, or failed to avail itself, the Pole itself is easily attainable. I will go further: from the quantity of driftwood, open water, and constant current observed by these Americans at their furthest point, there is every reason to believe that there exists a water communication, partially encumbered with ice, across the Polar area to the shores of the Asiatic continent, whence that wood comes, and it is quite within the bounds of probability that a bold navigator will, by holding on to the coast of the western shore, find himself in an Arctic summer, in a comparatively navigable sea near the Pole, and across to Asia whence the great masses of field-ice flow, which hamper the wide outlet into the Atlantic between Spitzbergen and Greenland, in one vast ice stream.

Some twenty years ago I stood on Western Greenland looking up at a mighty headland, named by the great navigator Davis "Sanderson, his Hope of a North-West Passage," and bethought me of the earnest faith of that old seaman who, 300 years ago, believed that one day his countrymen would pass across the wide and unknown space between it and the Pacific. Four years afterwards, I passed that great headland in company with M'Clure and his heroic companions, who had realised the hopes of old Davis. May we not in our generation be as confident of human progress and British adventure in another direction, and, looking at the mighty portal of Smith's Sound, express our hope that by the great headlands of Capes Isabella and Alexander, will before long pass a British expedition to lay open to human knowledge that great area of two millions square miles of unknown space which lies around the Northern Pole of our globe.

To those who have not closely, of late years, followed the subject of Arctic research, and are unacquainted with the scientific results likely to be reaped by a Polar Expedition, the question may arise—What are likely to be the useful results of a fresh expedition in that direction? The best answer I can give to such a query is an abstract from the memorandum of the Arctic Committee of the Royal Society, which has been formally presented to our Government. In a general sense they say—

"The results of scientific importance to be derived from an examination of the immense unknown area round the North Pole, are as numerous as the region to

* See letters of officers of 'Polaris' to President of American Geographical Society, published 1874.

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be explored is extensive. It may be shown that no such extent of unknown area, in any part of the world, ever failed to yield results of practical as well as of purely scientific value; and it may safely be urged that as it is mathematically certain that the area exists, it is impossible that its examination can fail to add largely to the sum of human knowledge. Further, it is necessary to bear in mind that the Polar area is, in many most important respects, of an altogether special character; affording exclusive opportunities for observing the condition of the earth's surface, and the physical phenomena there to be seen, under certain extreme and singular circumstances, which are due to the relation of this area to the position of the axis of revolution of the terrestrial spheroid, and which have to be considered, not only with reference to the present time, but to the earth's past history. It may be, therefore, received as certain that discoveries will be made in all branches of science, the exact nature of which cannot be anticipated. But there are also numerous objects, that have been stated and enumerated by the presidents and officers of the several scientific societies, the attainment of which make it desirable to despatch an Arctic expedition of discovery."

Of hydrography, they report—

"An Arctic expedition is a necessary complement to the expedition now investigating the ocean bottom in the middle and southern latitudes of the globe. The hydrography of the unknown seas has a most important bearing on the general question of oceanic currents, a question which is of practical consequence to navigation. Our knowledge of the general system of currents will be incomplete without an investigation of the currents, deep-sea temperatures, and sounding in the unknown area. Observations, at great depths, with the improved instruments now in use, would be of much value in connection with the like observations which are being carried on by the expedition now exploring the tropical seas."

Then they enumerate many other branches of science which would be enriched, and many problems solved by the research recommended, and they dwell particularly on botany, the report on which, as it embodies the views of the learned President of the Royal Society, Dr. Hooker, deserves to be given *in extenso*:—

"The vegetation of the Arctic Regions, in the opinion of Dr. Hooker, throws great light upon the geographical distribution of plants on the surface of the globe. On the return of Sir Edward Belcher's Expedition from those regions, a series of rocks collected in the neighbourhood of Disco, by his former fellow-voyager, Dr. Lyall, were placed in Dr. Hooker's hands, containing an accumulation of fossil leaves of plants totally different from any now growing in that latitude. These fossils he forwarded to Professor O. Heer, of Zürich, for investigation, who had brought forward the most convincing proofs that that latitude was once inhabited by extensive forests, presenting fifty or sixty different species of arborescent trees, most of them with deciduous leaves, some 3 or 4 inches in diameter—the elm, pine, oak, maple, plane, &c.; and, what was more remarkable still, evidences of apparently evergreen trees, showing that these regions must have had perennial light. It seems extremely probable that the vegetation, which belonged to the Miocene period, extended over a large portion of the Northern Arctic Regions. It would be of great interest to ascertain whether such vegetation extends towards the Pole; and there is nothing that would give greater assistance in solving this problem than the proposed expedition along Smith Sound. Turning to the existing flora of Greenland, Dr. Hooker has pointed out that, though one of the most poverty-stricken on the globe, it is possessed of unusual interest. It consists of some 300 kinds of flowering plants (besides a very large number of mosses, algæ, lichens, &c.), and presents the following peculiarities:—1. The flowering plants are almost without exception natives of the Scandinavian peninsula; 2. There is in the Greenland flora scarcely any admixture of American types, which nevertheless are found on the opposite coast of Labrador and the Polar Islands; 3. A considerable proportion of the common Greenland plants are nowhere found in Labrador and the Polar Islands, nor, indeed, elsewhere in the New World; 4. The parts of Greenland south of the Arctic Circle, though warmer than those north of it, and presenting a coast 400 miles in length, contain scarcely any plants not found to the north of that circle; 5. A considerable number of Scandinavian plants which are not natives of Greenland are nevertheless natives of Labrador and the Polar Islands; 6. Certain Greenland and Scandinavian plants which are nowhere found in the Polar plains, Labrador, or Canada, re-appear at considerable elevations on the White and the Alleghany and other mountains of the United States. No other flora known to naturalists presents such a remarkable combination of peculiar features as this, and the only solution hitherto offered is not yet fully accepted. It is that the Scandinavian flora (which Dr. Hooker has shown evidence of being one of the oldest on the globe) did, during the warm period preceding the glacial—a period warmer than the present—extend in force over the Polar Regions including Greenland, the Polar American Islands, and probably much now submerged land in places connecting or lying between Greenland and Scandinavia, at which time Greenland no doubt presented a much richer Scandinavian flora than it now does. On the accession of the glacial period, this flora would be driven slowly southward, down to the extremity of the Greenland peninsula in its longitude, and down to the latitude of the Alleghanies and White Mountains in their longitudes. The effect in Greenland would be to leave there only the more Arctic forms of vegetation, unchanged in habits or features; the rest being, as it were, driven into the sea. But the effect on the American continent would be to bring the Scandinavian flora into competition with an American flora that pre-occupied the lands into which it was driven. On the decline of the glacial epoch, Greenland, being a peninsula, could be repeopled with plants only by the northward migration of the purely Scandinavian species that had been previously driven into its southern extremity; and the result would be a uniform Scandinavian flora throughout its length, and this an Arctic one, from north to south. But in America a very different state of things would supervene: the Scandinavian plants would not only migrate north but ascend the Alleghanies, White Mountains, &c.; and the result would be that, on the one hand, many Scandinavian plants which had been driven out of Greenland, but were preserved in the United States, would re-appear on the Polar Islands and Labrador, accompanied with sundry American mountain types, and, on the other, that a few Greenland-Scandinavian types, which had been lost in the struggle with the American types during their northward migration, and which hence do not re-appear in the Labrador and Polar Islands, might well be preserved in the Alleghanies and White Mountains. And, lastly, that a number of Scandinavian plants, which had changed their form of habit during the migration in America in conflict with the American types, would appear in the Polar Islands as American varieties or representative species of Scandinavian plants.

"Whether or no this be a true hypothesis, it embraces all the facts; and botanists look anxiously to further explorations in the northern parts of Greenland for more light on the subject, and especially for evidence of rising or sinking of the land in Smith Sound and the countries north and east of it, and for evidence of ancient connection between Greenland and Scandinavia; for ob-

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CONTOUR CHART of the ATLANTIC OCEAN from Soundings to 1874.

I.E. Davis, delt.

Malby & Sons, lith.

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servations on the temperature, direction, and depth of transporting currents in these seas, and on the habits of its ruminant migrating animals, that may have influenced the distribution of the vegetation by transporting the seeds. Such facts as those of the existence of ancient forests in what are now Arctic regions, and of the migration of existing floræ over lands now bound fast in perpetual ice, appear to some naturalists to call for vaster changes than can be brought about by a redisposition of the geographical limits of land and sea, and to afford evidence of changes in the direction of the earth's axis to the plane of its orbit, and perhaps of variations in the ellipticity of the orbit itself.

"It has thus been shown that much interest attaches to the Greenland flora, which is far from being exhausted. And besides these general questions, there are others respecting specific subjects, of which our existing knowledge is very imperfect. A great interest attaches to the minute forms of vegetable life which swarm in Polar areas, affording food to the Cetaceæ and other marine animals, and which colour the surface of the ocean and its bottom likewise. Many of these forms are common to the Arctic and Antarctic seas, and have actually been far better studied in the latter than in the former sea. Of land plants the lichens and mosses require much further collection and study, and the Arctic marine flora is most imperfectly known. Ample collections of flowering plants should be made, with a view of testing the variability of species and their distribution; and observations on the means of transport of land plants, by winds, currents, ice, and migrating animals, are very much wanted."

This is the reply to the question suggested, and I submit that it is amply conclusive, and from the highest authority in Great Britain, if not in the world, and I take my leave of the subject for the present, hoping that before the next meeting of this Association, we shall have sent forth the reapers to reap the harvest which awaits us of honour and renown in the grim regions of the North, a service which I vouch, if properly sent, under Government auspices, will not return empty handed, and in which those chosen, I go bail, will be envied by their less fortunate brethren of my profession.

SHERARD OSBORN,
Rear-Admiral, C.B., F.R.S.

THE VOYAGE OF THE 'CHALLENGER.'

IV.

WITH regard to the contour or form of the earth beneath the waters (see contour chart), the North Atlantic may be said to be tolerably well delineated, still this delineation must be accepted with caution; and although much may be allowed between the necessity of having heights within certain distances for contouring the earth above the water, and depths for doing the same beneath the water, we have but to imagine how very erroneous any contour of the earth's surface would be if we had but a few elevations across the continent, 100 to 300 miles from each other, and in lines 1000 or 1200 miles apart, for the groundwork from which to draw the configurations. It would also be seen how possible it would be for some of the most extensive mountain ranges to be altogether left out: indeed, no form of the earth, such as we know it to be, could be delineated from such material. To a great extent the same difficulties must exist in attempting to contour the bottom of the ocean, which possibly may have its mountain ranges on which the sinker has never struck. But, from the soundings obtained, a contour can be drawn, subject to the doubt expressed, and strange to say that in those places where we might reasonably infer that the islands which do seem to form the summits of the same submerged mountain ranges have deep water between them, such as St. Helena to Ascension, and St. Paul Rocks to Fernando Noronha, and even the peaks of Tristan da Cunha group have a depth of 6000 feet between them.

In the North Atlantic the number of soundings enable us to present a very good idea of its conformation. First, we have the 'Challenger's' line across the ocean, near and cutting through the Equator; the second, from the Canary Islands to the West Indies; the third, from the Azores to Bermuda, and also north of Bermuda, by the same vessel; the lines of the Atlantic cables previously sounded; and that also of the projected North Atlantic route by Færoe, Iceland, Greenland, and Labrador, besides a number of independent soundings which for this purpose are applicable; but in the South Atlantic we have but the one line sounded by the 'Challenger,' with the soundings far apart, and but very few independent ones, so that the attempt to contour the bottom south of the Equator is of a very speculative character.

The contours in the North Atlantic present an irregular belt, in form like the letter ∽ reversed, exceeding 2500 fathoms in depth from very near the coast of the United States and the Bahama Islands, towards the African Coast, between the Canaries and Cape Verde Islands, and to within 350 miles of the coast, while two channels run to the north and to the south—those to the north running between Madeira and San Miguel to the latitude of the English Channel, and between the Milne Bank and the Bank of Newfoundland to about latitude 48° N.; whilst to the south the channels run on either side of the Dolphin Rise, that to the west extending only to about latitude 12° N., but the other running to the south-east, parallel to the African coast into the South Atlantic. The 2000 fathoms contour lengthen the channels on either side of the Azores: on the east side, towards Greenland to 52° N., and on the west side to the entrance of Davis Strait. These two gullies indicate that a bank of less than 2000 fathoms extends from Greenland to the Azores. To the south, the 2000 fathoms channel on the west side of the Dolphin Rise is carried between St. Paul Rocks and Fernando Noronha, and between Fernando Noronha and the American coast, into the South Atlantic. Of course this 2000 fathom contour is the best defined; but every intermediate reliable sounding hereafter obtained will prove of great service in verifying or otherwise these contours. A further examination of the Dolphin Rise will be most interesting; and the vast shoal, of which the group of the Azores is the nucleus, and which extends north and south about 700 miles, with a depth under 1500 fathoms, would also be a portion of interest for closer examination.

The nature of the bottom at a depth exceeding about 2700 fathoms, as being a kind of red clay, was commented on in the previous account of the 'Challenger's' proceedings; and although this red deposit was not found in the section crossing the Equator, it was again met, as red mud, in the deep but rather shoaler water in the section across the South Atlantic, both on the African and South American sides.

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The important bearing which the temperature of the ocean at various depths has upon the question of its general circulation, is admitted, as it was one of the primary objects of the expedition; and whether the Polar cold or the Equatorial heat be the *primum mobile* of this vast system, the facts as recorded by the observations of the 'Challenger' must be the groundwork, or bases of the arguments, on which the theory is to be established; and whether we look through the figures as depicted in the curves, or the general results as delineated in the sectional diagrams of the serial temperatures, we are equally struck with the care and attention, as well as the labour, that has been devoted to the subject.

To ensure as good a comparison as possible, the same line was always used in obtaining serial temperatures. They were frequently observed at every 100 fathoms between the surface and a depth of 1500 fathoms, from seven to ten thermometers being secured to the line at one time, with a bottom-sinker of half-a-hundred-weight. Every attention was paid to ensure the line being up and down; for with a surface-current it is difficult to be certain whether it is or not, unless a very heavy weight be used. This would endanger the loss of instruments by the great strain on the line when heaving in. With all the care taken, the index registers frequently denoted a temperature that could not possibly be at the depth to which the thermometer had been submerged; and the only way that this deviation from the truth could be accounted for would be, that the indices had been moved by the vibration caused by the surface-current through which the line to which the instruments are attached, is being drawn.

All the temperatures noted were corrected for pressure as found by previous experiment; and when it is stated that the maximum error due to pressure never exceeded 1.4° or 1.5°, and that, for all practical purposes, progressive in proportion to depth, it may well be conceived that no error can amount to more than three or four tenths of a degree, which, when considered in connection with the difficulty of reading the instrument to such accuracy, may be assumed to be positive, as errors arising from, and due to mechanical construction are generally so great as to render their record so far satisfactory as to leave no doubt in regard to their rejection.

The temperature of the water at the Equator east of St. Paul Rocks, is considered at its normal state at all depths, cooling as it does gradually as the depth increases, and undisturbed by currents except at the surface, and that any deviation from this normal state is caused by movement of the water. Thus, notwithstanding the great increase of heat in the surface water at the Equator, the decrease in temperature is so rapid, that with a surface temperature of 78°, at a depth of 60 fathoms, the temperature is 61° 5′, the same as at Madeira at the same depth; and, at a depth of 150 fathoms the temperature is 50°, the same as in the Bay of Biscay at the same depth.

Beneath the water immediately affected by the sun's rays*—which is not believed to extend below 60 or 80 fathoms—all the water in the North Atlantic, as far north as the 40th degree of latitude, is warmer than at the same depth at the Equator. The only exception to this is at Bermuda, where, between 850 and 1500 fathoms, the temperature is slightly less. This may be accounted for by the action of the Labrador current passing under the Gulf Stream; and it is the only instance in which the action of Arctic water could be traced. The mean temperature of the upper 1500 fathoms of water in the North Atlantic is four degrees and a half warmer than at the Equator.

In the northernmost serial-temperature section—(see Table of Isothermal Sections) that between Madeira, the Azores, and Bermuda, proceeding westward—the isotherms, to a depth of 400 fathoms, show an increase of temperature in proportion to depth; whilst below that depth there is an evident increase the contrary way to 800 or 900 fathoms. In the next section, that between the Canary Islands and the West Indies, the same development of temperature occurs; but in the last-named section there is a dip to the southward of about eight degrees between the east and west end of the sections. As that is not the case in the somewhat curved line of the first named, and also with the knowledge that the effect of the solar heat is but superficial, the difference in the depth isotherms cannot be attributed to latitude. The depth isotherms on the Equator are nearly equal.

The manner in which the isotherms, between 60 and 40 degrees in the first of the two northern sections, are pressed down or squeezed together by the warm belt on the western side is remarkable, the temperature of 40° being at about the same depth in both sections below the 60° isotherm at 700 fathoms. The temperature relative to depth is similar in an extraordinary degree, and indeed varies so slightly that no conclusions can yet be drawn from them. Immediately the warm belt in the northern section is lost, west of the Azores, the water, which to the westward was pressed down, rises, and occupies exactly the same depth at which it is found in the section taken nearly 1000 miles to the southward. A position about 200 miles west of the Azores seems to be the one most free from currents. About the islands themselves, there are evident indications of local disturbances.

Soon after the warm belt is lost, a broadening of the isotherm between 45° and 55° takes place. As this change agrees so nearly with that found on the coasts of Europe, being water of the same temperature, and occupying the same abnormal depth of 700 fathoms, it is supposed that a connection exists, and that the overflow of the Gulf Stream passing north of the Azores, strikes against the coasts, and *banking down* part of it—having lost 15 degrees of its heat—branches off to the southward, occupies the place of that originally blown to the westward by the trade winds, cooling all the time: for the isotherm of 45° on the southern section is only 550 fathoms from the surface, whilst in the north it is 700 fathoms; the water at that depth is therefore 3 degrees warmer in the north section than in the south.

The temperature of the bottom water varies but little excepting on the west side, where, in the deepest part of the south section, the water is slightly colder than that found elsewhere. On the eastern side of the Atlantic, passing the Azores and Cape de Verde Islands, it is remarkably uniform at 35·2° North-east of this curved line in the Bay of Biscay, the bottom temperature is one degree warmer, and south-

* *Vide* the Report.

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ATLANTIC OCEAN,—WEST TO EAST ISOTHERMAL SECTIONS.*

BERMUDA TO AZORES AND MADEIRA.

Position.		Bottom.		Temperature.													Surface Temp.
Lat.	Long.	Depth.	Temp.	34°	35°	36°	37°	38°	39°	40°	45°	50°	55°	60°	65°	70°	75°	
N. ° ′	W. ° ′	fms.	°	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	°
32.54	63.22	2360	35.	...	...	1590	1230	870	750	680	520	450	400	350	110	60	...	74.
34.28	58.56	2575	35.	...	...	1630	1310	920	810	670	500	430	370	300	90	20	...	71.5
34.54	56.38	2850	35.1	...	...	1690	1340	970	790	660	510	440	380	295	80	10	...	71.
35.7	52.32	2875	35.2	...	...	1750	1400	1020	750	650	500	430	360	270	70	...	...	70.
36.33	47.58	2700	35.1	...	...	2110	1430	1100	980	860	600	530	450	330	50	20	...	72.5
37.24	44.14	2750	35.3	...	...	1960	1390	960	830	750	610	520	420	330	40	10	...	70.
37.54	41.44	2700	35.2	...	...	1860	1360	870	740	690	530	470	410	310	60	10	...	70.
38.23	37.21	2200	35.1	...	...	1800	1370	1070	910	750	550	420	340	180	40	10	...	71.
38.18	34.48	1675	35.9	...	...	1600	1110	840	750	650	410	310	200	60	20	...	...	71.
38.34	32.47	1240	37.1	...	...	...	...	1110	880	760	500	320	220	130	10	...	...	71.
38.30	31.14	1000	38.7	...	...	...	...	...	960	840	520	390	270	100	20	...	...	69.
38.11	27.9	900	39.5	...	...	...	...	...	...	890	610	400	130	90	50	...	...	70.
...	...	1000	...	...	...	...	...	...	...	900	620	390	180	60	30	...	...	71.
36.21	23.31	2025	34.8	...	...	...	1320	1150	1000	900	640	380	160	60	40	...	...	71.5
35.3	21.25	2660	35.3	...	...	...	1350	1170	980	900	700	400	150	50	20	...	...	71.
33.46	19.17	2400	35.3	...	..	...	1390	1140	1000	920	750	430	180	90	50	...	...	70.7

WEST INDIES TO CANARY ISLANDS.

18.40	62.56	1420	37.4	...	...	...	...	1080	920	790	490	380	300	220	170	100	...	76.
18.56	59.35	2975	34.8	...	...	1700	1330	1030	870	710	400	310	260	210	160	100	...	75.
19.41	55.13	2650	34.9	..	...	1650	1300	1020	840	710	460	370	280	210	160	110	...	74.
20.7	52.32	2385	35.4	...	...	1660	1290	1030	860	720	470	370	280	210	160	100	...	74.
20.49	48.45	2325	35.1	...	...	1650	1260	1030	890	750	460	360	280	200	140	90	...	72.5
21.38	44.39	1900	35.3	...	...	1610	1210	1010	840	720	500	390	290	210	150	90	...	72.
23.10	38.42	2720	35.4	...	...	1660	1250	1030	890	760	460	350	260	180	130	90	...	72.
23.12	32.56	2700	35.5	...	...	1680	1300	1100	1010	910	520	360	280	190	120	...	...	67.
24.20	24.28	2740	35.6	...	...	1700	1390	1180	1030	930	560	360	250	160	70	...	...	68.
25.28	20,22	2220	...	...	...	1660	1480	1280	1110	990	530	350	240	160	40	...	...	66.
25.52	19.22	1945	35.5	...	...	1640	1410	1220	1090	970	520	330	230	150	90	...	...	67.
27.24	16.55	1890	35.6	...	...	1600	1290	1130	1030	920	580	350	210	130	...	...	...	64.5
Canary Islands		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	64.

PERNAMBUCO TO FERNANDO NORONHA, ST. PAUL'S ROCKS, AND LONG. 14° 49′ W.

S.																		
7.37	34.12	1650	36.2	...	...	...	1170	690	390	320	230	190	170	120	90	60	20	77.5
5.1	33.50	2275	33.2	2120	1780	1460	1120	770	490	310	220	170	100	60	50	40	20	78.
3.33	32.16	2200	32.9	1990	1760	1580	1300	910	530	350	230	170	100	60	50	40	20	78.
N.																		
0.9	30.18	2275	33.6	2150	1880	1580	1250	910	590	380	240	180	120	90	70	60	50	77.5
1.47	24-26	1850	35.3	...	...	1700	1380	1070	730	430	210	140	90	60	50	40	30	78.8
2.6	22.53	2275	35.2	...	...	1680	1300	1000	710	540	250	160	120	90	50	30	10	78.
2.25	20.1	2500	35.1	...	...	1650	1140	850	660	560	300	190	120	80	60	50	30	78.
2.52	17.0	2475	34.8	...	...	1600	1120	830	630	460	260	180	120	80	60	50	30	77.
3.8	14.49	2450	35.1	...	...	1560	1100	810	600	420	250	170	110	60	50	40	20	78.

SOUTH AMERICA TO TRISTAN DA CUNHA AND CAPE OF GOOD HOPE.

S																		
20.13	35.19	2150	33.1	1880	1530	1180	820	550	450	390	290	210	180	130	90	50	...	74.
26.15	32.56	2350	33.4	2250	1910	1420	580	520	480	440	340	250	190	100	40	...	...	69.
29.35	28.9	2275	33.3	2020	1600	1190	790	560	500	470	330	240	180	110	...	...	...	65.
35.25	23.40	2050	34.	2050	1690	1350	990	650	410	390	290	200	100	...	...	...	..	58.
36.12	12.16	2025	34.9	...	1300	880	520	450	400	380	230	60	...	...	...	...	...	53.5
36.43	7.13 E.	2100	34.	2100	1520	1010	560	450	400	380	280	190	...	...	...	...	...	54.
35.59	1.34	2550	33.2	2250	1730	1190	600	500	450	400	290	220	120	...	...	...	...	56.1
36.22	8.12	2650	33.8	2390	1990	1500	990	500	420	390	280	210	130	..	...	...	...	56.2
35.35	16.9	2325	32.9	1960	1680	1220	500	390	350	320	230	120	40	...	...	...	...	56.2
35.0	17.57	1250	...	...	...	1160	490	380	330	310	220	130	60	...	...	...	...	59.

* From Captain Nares's diagrams of Isothermal lines.

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west of the line it is half a degree colder; further south, again, at the Equator, on the western side of the Atlantic, the bottom temperature is 32·4° or 2·8° colder.

There being bottom water of a temperature of 32·4° at the Equator, with warmer water at all the stations north of it, Captain Nares argues that it proves unmistakably that the cold water at the bottom of the Atlantic as far north as the Azores and Bay of Biscay, equally with that at the Equator, is derived from an Antarctic and not from an Arctic source: for if at the Equator the water supplied from the southward retains its cold temperature to so great an extent, the bottom water of the North Atlantic, if supplied from the nearer Arctic sea, should at least be as cold; but the temperature of the lowest stratum increases decidedly as we pass north, and completely cuts off the Arctic water found at the bottom of the Færoe Channel by the 'Porcupine' from that found at the Equator. On the western side of the Atlantic, at all the stations south of the northernmost line, the bottom water is colder than on the eastern side, showing that the Antarctic cold current enters the North Atlantic, and runs to the north-westward through the channels between St. Paul's Rocks and the Brazilian coast, and gradually expends itself as it circles round to the north-eastward, in the same manner as the warm equatorial current does on the surface, considering that current as including the Gulf Stream, which it undoubtedly helps to produce. This cold current entering the North Atlantic is found between 1700 fathoms, and the bottom, a total thickness of 700 fathoms.

In comparing the temperatures of the water at different depths at several stations with that found at the Equator, the alteration is very marked, and may readily be distinguished. The greatest change or disturbance at Sombrero, West Indies, is an increase of heat of from 14 to 15 degrees at a depth of from 100 to 250 fathoms. At Bermuda the maximum rise is 19 degrees, but at the lower depth of from 300 to 650 fathoms: even in the Bay of Biscay the increase is 8 degrees at a depth of from 300 to 500 fathoms.

Thus the heat-giving properties of the equatorial and north-east trade current, carrying as they do a continuous body of warmed water towards the Carribbean Sea, can be traced by the rise in temperature of the whole body of water at Sombrero and afterwards at all the stations in the North Atlantic; but most readily so by the widening of the isotherms about 62° between America and the Azores, forming an immense reservoir of warmed water 1000 feet thick, and at least 2,000,000 square miles in extent. This change of temperature or disturbance is greater and nearer the surface on the western side of the Atlantic (the nearest point to the source of the current) than on the eastern side, where it slowly but gradually expends itself, sinking as it expires.

The most remarkable fall of temperature due to depth was found at a station 180 miles south of Cape Verde Islands, at the south edge of the trade-wind, the temperature at 50 fathoms being 54·2° when the surface was 78°, a fall of 24°.

As a proof of the superficial nature, it was found that when the equatorial current was running to the westward three quarters of a mile an hour at the surface, it was running four-tenths at the depth of 50 fathoms, but at the depth of 75 fathoms there was no current.

The serial temperatures obtained between the American and African coasts vary less than those obtained in the North Atlantic basin. Although the water is much colder than in the northern seas, it is, strange to say, warmer than at the Equator to the westward of St. Paul's Rocks. The coldest water obtained on the western side of the South Atlantic was near the American coast, where it was 33·1° at a depth of 2150 fathoms. Further from the land, and in deeper water, the temperature, which was expected to be colder, was 33·4° at 2350 fathoms; but, as between the stations there was a distance of 350 miles there was quite sufficient space between them to contain a cold-feeding current running to the northward.

The bottom water near Tristan da Cunha, midway between the continent, is 1 degree warmer than that nearer the land on either side. At a distance of 130 miles a temperature of 32·9° was found at a depth of 2325 fathoms.

Taking the water at the Equator, west of St. Paul's Rocks, below 100 fathoms as being the least disturbed, and therefore the best for comparison, the water between 50 and 400 fathoms at each of the stations between the Brazilian coast and Tristan da Cunha is found to be warmer than the equatorial water. This is accounted for by the reasoning that the Brazilian branch of the equatorial current curves to the southward and the southern part of the south-east trade-wind current banks up and collects the warmed water in that part of the sea. To the eastward of Tristan da Cunha the difference becomes gradually less, until at 300 miles westward of the Cape of Good Hope the water is colder at all depths down to 1500 fathoms, after which it is much the same until near the bottom, where it is half a degree warmer than at the Equator.

The table of latitudinal isotherms* (see Table of North and South Isothermal Section), deduced from the four lines of longitudinal isotherms, will prove interesting in showing the action of the cold Antarctic water in its flow north. In the northern lines are seen the breadth to which the warmer stratum of water extends—how they are compressed towards the Equator, — how they expand again in the south, though not to so great a degree as in the north, the cold Polar water coming near the surface—and how progressive the thickness of the cold water, say below 40°, increases from the Sombrero and Canary Island line towards the south.

The first indication of the warm surface Agulhas current was found 380 miles west of the Cape, where the temperature of the water was 60°, this being 4 degrees higher than that registered on the previous or succeeding days, the current, indicated by the difference in the position of the ship by dead reckoning and astronomical observation, being 25 miles northerly in the twenty-four hours; part of this being probably due to the prevailing strong southerly winds. The actual stream, or branch, running to the northward on the western side of the Cape was not entered until in shallow soundings, and only 21 miles from the land, when the temperature of the surface water rose from 58° to 62°. Five miles

* The course of these sections are inserted on the contour chart.

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ATLANTIC OCEAN.—NORTH TO SOUTH ISOTHERMAL SECTIONS.

WESTERN SIDE.

Position.		Bottom.		Temperature.													Surface Temp.
Lat.	Long.	Depth.	Temp.	34°	35°	36°	37°	38°	39°	40°	45°	50°	55°	60°	65°	70°	75°	
N. ° ′	W. ° ′	fms.	°	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	fms.	°
34.54	56.38	2850	35.1	...	...	1690	1340	970	790	660	510	440	380	295	80	10	...	71.
19.15	57.47	3000	34.4	...	...	1690	1320	1010	850	700	410	320	250	200	150	90	..	75.
S																		
1.45	30.58	2475	32.4	2070	1810	1560	1260	910	660	360	210	160	100	60	50	40	30	78.
26.15	32.56	2350	33.4	2350	1910	1420	580	520	480	440	340	250	190	100	40	...	...	69.

EASTERN SIDE.

N																		
*37.54	41.44	2700	35.2	...	...	1850	1340	860	710	680	520	460	390	290	40	10	...	70.*
*35.3	21.25	2660	35.3	...	...	2090	1340	1160	970	880	700	390	130	40	20	...	...	71.*
23.23	35.11	3150	35.4	...	...	1680	1280	1090	960	830	490	360	260	180	120	20	...	72.
2.6	22.53	2275	35.2	...	...	1670	1280	980	700	520	220	150	100	70	50	30	10	78.
S	E																	
35.59	1.34	2550	33.2	2240	1730	1190	600	500	450	400	290	220	120	...	...	...	...	56.1

* Either of these two positions can ba used with the observations that follow them.

nearer the land a serial-temperature observation proved that the water was affected to 90 fathoms, the temperature being raised 3.5°

An extended series of observations are required to ascertain the cause of the stoppage or turning of the Agulhas current. The observations of the 'Challenger' indicate that the broad and comparatively sluggish South Atlantic drift-current, running to the eastward before the continuous westerly winds, accumulates its water against the West Coast of Africa, raising the level of the sea sufficiently to prevent the Agulhas current continuing its course, and swallows or diverts nearly the whole of it, a very small portion escaping to the northward round the Cape during the southerly winds, intermixing with the colder water of the drift current, which also throws out an offshoot to the northward as it strikes against and meets the African coast and Agulhas stream. Great variations in temperature may naturally be looked for when two such oppositely constituted currents meet and intermingle. It is well known at the Cape of Good Hope, that the warm current seldom extends as far to the north as Table Bay, the water there being much colder than in Simon's Bay.

During the stay of the 'Challenger' in Simon's Bay, the wind was blowing nearly continuously from the south-east, and the temperature of the sea was from 62° to 64°, the same temperature, and therefore water derived from the same source, as was found outside close to land; but on one occasion this warm water was driven out of the bay by a north-westerly gale, and replaced in about six hours by water of a temperature of 51°. This applied not only to the surface water, but to that at the depth of 9 fathoms, in which water the ship was anchored, and to which the observations extended. The current usually circles round the bay from Cape Agulhas to Cape Point; on this occasion, whilst the water was gradually cooling, a current was circling round the bay in the opposite direction, running to the eastward from Cape Point towards Cape Agulhas.

From this the inference is drawn, that during north-westerly gales the pressure of the wind is sufficient to overpower and drive the narrow branch or horn of the Agulhas current, which at other times is found touching the Cape, to the southward with the rest of the stream. Immediately the pressure from the north-westerly wind is withdrawn, and the water in the bay increases in temperature, it indicates the return of the warm Agulhas stream.

It is remarkable that the surface water, of a temperature of 51°, found in Simon's Bay during the north-westerly gale was colder than that found at any station to the westward during the passage across the ocean except at a depth of 50 fathoms; the lowest surface temperature being 54°.

Again, when passing out of Simon's Bay, a cold belt of water was entered, and in the distance of 5 miles the temperature of the water had fallen 9° —or from 64°, at the anchorage, to 55°. This was found to extend 10 miles off the Cape; it then rose again to 65° and 66°. This cold water is evidently a spur of the Atlantic easterly drift-current forcing its way into the warmer water of the Agulhas current; or rather, the Agulhas warm current overrunning and spreading itself out above the colder water of the Atlantic drift, the dividing line being very marked. Ten miles further to the southward, warm water was found extending to a depth of 50 fathoms.

When at a distance of 100 miles south of Cape Agulhas, the temperature of the water suddenly rose from 67° to 72°, proving that the warmest part of the current had not reached Simon's Bay during the stay of the ship.

The 'Challenger,' having been thoroughly refitted, and due preparation made for the weather she was likely to experience in the Antarctic seas—having also filled up the vacancies in the crew, including that of the photographer, who, either tired of his profession in the Royal Engineers, or lured to the diamond-fields to make his fortune in a more inglorious way, had caused himself to be "absent without leave" too long, —and a cargo of treasures in the shape of cases of natural history collections having been transhipped for England, the kind, hospitable people of the Cape said "good-bye" to, sailed on the 17th of December

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1873, from Simon's Bay, the weather beautifully fine, and all hands full of life and spirits at the prospect of again getting into a temperate climate—and, it may be added,—visiting places of which but little is known.

A sounding was taken in the afternoon. In 98 fathoms green, sandy mud the dredge was lowered, and a quantity of star-fishes, shells, hermit-crabs, coral, &c., brought up. The Agulhas current was entered on the 19th, 80 miles to the southward of the Cape. The breadth of the stream was about 250 miles, and it was found to affect the temperature to a depth of about 400 fathoms. A sounding was taken in 1900 fathoms, and serial-temperatures taken at every 10 to 100 fathoms, and at every 100 to 400 fathoms; specimens of water were also obtained from 50, 100, 200, 300 and 400 fathoms. The dredge was put over with 2600 fathoms of rope.

The weather and a heavy sea prevented a more extensive examination of the Agulhas stream, which so much influences the climate of the Cape of Good Hope. This great body of heated water, similar to the Gulf Stream, is driven to the westward from the Indian Ocean by the combined action of the north-east monsoon and the south-east trade winds; and on reaching the longitude of the Cape, it is met by the cold drift current of the Atlantic, caused by the continuous westerly winds of the higher latitudes, and forced back to the south-east and eastward, at one time the warm stream prevailing, at another the cold, according to the prevalence and force of the wind.

The usual strong westerly gales of these latitudes were experienced as the ship ran before it towards Prince Edward Islands, and the usual albatross and Cape hen kept company, as if in satire, to wish the voyagers a Merry Christmas. On the eve of that day a yellow-crested penguin suddenly rose alongside the ship and hailed her in its inharmonious croak or bark, and then as suddenly dived out of sight. The weather was thick and drizzling, and Christmas Day was spent under anything but agreeable circumstances; but, as in the preceding one, doubtless many a thought was sent to the loved ones at home, and as many thoughts sent back, with as full knowledge of their nature in the hearts of the sender and receiver as if the insulated wire had conveyed it. The weather cleared up in the evening, and Marion Island seen, and shortly after Prince Edward Island—the peaks of both being shrouded in mist.

These two islands are supposed to be the *Denia* and *Marseveen* of Van Kuelen, but they were placed so much out in position as to render it doubtful. The first discovery is accorded to Marion du Fresne, in 1772, then in command of a French expedition in search of a southern continent supposed to exist, and which from the size of the island, as seen through the haze, he believed it to be, and named it Terre d'Espérance; but he was undeceived the next day. Both of his ships struck on the rocks, and were nearly wrecked. He also discovered the Crozets, named after one of his officers.

Before the particulars relating to the discovery had been published, Captain Cook, then on his last memorable voyage four years after, also discovered them, and named them Prince Edward Islands; subsequently the northern one retained that name, whilst to the southern was accorded the name of the original discoverer. It is a strange coincidence, that while Cook fell a victim to the natives of the Sandwich Isles, Marion was massacred by the natives of New Zealand.

Marion Island is about 35 miles in circumference, and rises 4200 feet above the sea, the high land being completely covered with snow to within about 1000 feet above the sea; the summit is about 4 miles in diameter, and has the appearance from the north of a series of rugged nipples. The land slopes to the shore in a steep incline on three sides, the fourth sloping more gradually, and terminating in a steep, low cliff. On the inclines are numerous extinct craters, some with the red volcanic ashes round them. The sides of the hills are thickly studded with lava boulders, cropping out through the boggy vegetation.

Prince Edward Island is not so large as Marion, being only about 15 miles in circumference; it lies 13 miles north-eastward from Marion. On its eastern side is Cove Bay, in which, at times, vessels anchor.

The next day, the weather being moderately fine, the ship was steered for Marion Island. Having passed the north end of the island within 1½ miles of Prince Rock, which resembled a boot in shape, a small portion of the coast on the lee side appeared to have less break of the surf than the rest. The ship was steered in towards it, and a boat despatched to ascertain if it was possible to land; the report being in the affirmative, the ship *hove to* about half-a-mile from the shore—the incline being too steep to anchor—and exploring parties at once landed. While these were engaged gathering anything and everything they could lay their hands on, the ship stood off and on between the islands, ransacking the bottom of the sea by dredging. Fortunately the weather was fine enough to enable astronomical observations to be taken.

The ground rises from the shore to the summit in a series of long spurs separated by gullies, down which streams of water poured from the melting snow above. The shore was a scene of grand desolation—bold rock with beaches of huge boulders in all shapes, and so slippery from the half-dried kelp, as to require much caution in leaping from one to another. Abundance of kelp lined the shore in the water, and innumerable penguins the land. The hill-side was covered by a mixture of moss and grass, so saturated with water that walking through it resembled wading through a bog.

The Kerguelen cabbage was found in great abundance, and proved very palatable when boiled, notwithstanding its slightly medicinal flavour. But the great feature was the number of nests, described as a perfect bird-warren, for while the petrels and small birds placed their nests in the hollows of the ground, under the large tufts of moss, the larger albatross covered the higher ground in nests raised about 2 feet above the ground, clear of the moisture, and in such numbers that they looked like a flock of sheep. Most of them were roosting, and took no notice whatever of the invaders of their soil. It was evident that the breeding season was only commenced, as but few eggs were obtainable.

The albatross, although one of the most graceful birds in creation when on the wing, swimming with such stateliness through the air, or rising and falling with the mountain waves of the southern sea, is but an awkward animal on *terra firma*. Its walk is a very waddle, and having no idea of hovering to alight,

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it often fails in the attempt; or, if it succeeds, comes with such a flop and impetus to the ground that it topples over on its head, at times making a complete somersault; sometimes it gets completely on its back, and has great difficulty to regain its feet. To rise from the ground, they run for some distance with extended wings, until they obtain an impetus sufficient to float them in the air; but once landed they are powerless to resist attack. A sharp snap with the beak is their only mode of defence, although that snap will produce a good wound on unprotected flesh. To obtain its egg a push with a stick on the breast of the poised bird, as she sits on the side of the nest, is sufficient to send it sprawling on its back, and before it can regain its upright position the prize egg is gone, and the wail of the despoiled mother, as she perches again on her rifled nest, tells the tale of her woe.*

Three kinds of penguins were found on the island, viz., the king penguin, a black and white one without crest, and the small yellow crested kind, similar to that found at Tristan da Cunha. The breeding season of these animals was nearly over; but some eggs were found unhatched. The king penguin makes no regular nest; but, if disturbed, carries its egg between its legs in a fold of the skin under the belly, and again sits where it stops. The sheath-bill, a land bird, follows the poor penguin with its egg most pertinaciously, to seize it at any unguarded moment.

Hoping that the weather might continue favourable, and enable a party to land on Prince Edward Island the next morning, the ship was *hove to* for the night; but the morning proved misty, and heavy clouds covered the island, which compelled Captain Nares to relinquish his intention and proceed at once towards the Crozets. Several rich hauls with the dredge were obtained before making sail.

On the 29th, when 200 miles from the Crozets, soundings were obtained in 1375 fathoms white ooze, and the trawl was let down with much success, bringing up many new specimens, including cuttle-fish, Venus's flower-basket, &c. Whilst sounding, four penguins came up suddenly, and having conversed with each other, disappeared. The next day 1600 fathoms was found when 86 miles from Hog Island: a serial temperature was obtained. Hog Island, the westernmost of the Crozets, was sighted in the evening, soon after ten o'clock.

The morning proved unfavourable for approaching the island—a wet fog; it lifted a little in the afternoon, but the mist did not rise from the land, and, on approaching, nothing but the breakers on the shore could be seen. In the evening the dim outline of the Penguin Islands was seen through the mist. Both islands rise abruptly from the sea, the summits appearing as sharp pinnacles rising suddenly from above the high land.

The new year set in with the same misty weather, and there being no probability of landing or even correcting the charts. On the afternoon of the 2nd the ship was steered for Possession Island, the middle island of the group, and the voyagers were rewarded by a fine view both of Possession and East Islands, the former rising in two peaks nearly 5000 feet above the sea.

As before remarked, the Crozets were originally discovered by Captain Marion du Fresne, and afterwards seen by Cook. The group consists of five islands, of which Possession Island is the largest. They were surveyed by Captain Cecille in the French frigate 'l'Heroine,' but such is the nature of the climate, and so constant the gales and fogs, that although several weeks in the vicinity, they were but imperfectly surveyed after all. Captain James Clark Ross, in the 'Erebus,' visited the islands in April 1840, and as he had received on board some provisions for a party of sealers on Possession Island, and also having appointed the island as a rendezvous for his consort the 'Terror,' from which ship he had parted company, he had two reasons for wishing to communicate with the island.

They first made Hog and Inaccessible (or Penguin) Islands, the last most appropriately named, having steep and perpendicular rugged cliffs in every fantastic shape, and from which the imagination could easily form ruins of castles, cathedrals, &c., heaped one above another, the picture of desolation; not a particle of verdure to be seen, but plenty of animal life in the myriads of penguins which occupied the ridges, like soldiers in line, wherever there was footing for them. The 'Erebus' ran quickly past the island, hoping to make Possession Island before dark; but not doing so, the ship was hove to for the night. It was not till three days after that the ship could be got in with the land. Guns were fired to attract attention, which were soon answered by a fire on the shore; but the ship was too far to leeward for a boat to venture off. As is often the case in these latitudes, the wind increased rapidly to a gale, and the ship was obliged to stand off again. The next day they again hoped to communicate, but it fell quite calm with the ship 5 miles from the shore. On the 1st of May, Captain Ross succeeded in getting off American Bay, and a boat was soon launched and came out from the shore. Of course great curiosity was felt to see the men who could be induced to live on such a place. The establishment consisting of about a dozen men employed by a Mr. Jerry, a merchant of Capetown. The boat, with six men, was soon alongside; one of the men, Mr. Hickley, being in charge of the establishment. They were fine, hardy-looking fellows, but abominably dirty. They did not ask for news, or even where the ship was going, but only seemed disappointed that the ship was not going to take them to the Cape. When they were told that stores for them were on board, sent by their employer at the Cape, they evinced no interest about them; and even when Captain Ross gave them a gallon of rum, they seemed to accept it as a trifle scarcely worth thanks. They had seen the ship for two days, but had seen none other, saving an American whaler two months before. Mr. Hickley informed them that they captured a large number of sea elephants, the tongue and flippers of which they eat; they also catch a considerable quantity of a species of rock cod, which is salted down. The eggs of the sea birds can be obtained in any quantity, and the young of the albatross, when taken from the nest, is considered a delicacy. During the summer months they visit Pig

* The action of these birds is sometimes most ludicrous. The author has observed three standing at points of a triangle on a cliff, with out-stretched necks towards each other, and as if in deep and earnest conversation. One would, as it were, lay down the law, moving its head up and down, whilst the others listened with heads on one side; and when the speaker had finished, another commenced. This lasted for upwards of an hour while they were watched. Of course when they commenced or when they left off could not be known.

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Island for the purpose of killing pigs, which abound in large droves; the pork is salted down for their subsistence on the island, and for provisions in going to and from the Cape. Many goats exist on Possession Island, and wild ducks in great abundance.

When the stores were in the boat, and the men were told by Captain Ross that he wanted to make sail and wish them good bye, they, without any expression of regret or interest, went into their boat and pulled off. It was remarkable to see men shut out from the world so long, so utterly devoid of curiosity, and it caused some reflection as to how soon a man may degenerate into the savage. They have no females, or anything to render life tolerable, and they seemed to be losing the powers of conversation, for it was with difficulty anything could be extracted from them.

On the 'Challenger' approaching the south-east end of the island, it was noticed that the sun was shining on it continuously, and the ship passed gradually out of the fog, leaving it as a wall behind them, into clear weather, with scarcely a cloud to be seen overhead. To the northward the fog was as thick as that sailed out of, and the peaks of East Island, situated to leeward of Possession Island, as the wind then was, showed themselves above a dense bank of white fog-cloud, thus proving that the lofty hills of Possession Island had the property of dispersing the fog as it passed, so that whilst the weather side of the island was enveloped in mist, the lee side was perfectly free from it. In connection with this circumstance, it was noticed that there were no albatross nests on the misty side of the island, whereas the clear part was thick with them. One fact in regard to Possession Island was curious, viz., that although 1000 feet higher than Marion Island, it was nearly free from snow, whilst the latter was entirely covered with it.

The 'Challenger' steamed to within half a mile of Navire Bay, and seeing a hut at the bottom of the bay, with what appeared to be a boat and some casks near it, the ship stood in, and fired a gun to attract attention, but after waiting some time, and seeing no sign of life about the hut, she stood to the northward towards America Bay. On opening the north-east coast a swell was found from the northward, rendering it unsafe to anchor, and the 'Challenger' proceeded on her way towards Kerguelen Island.

On the 6th of January Bligh's Cap was sighted, and the next morning the 'Challenger' anchored in Christmas Harbour.

J. E. DAVIS.

SIGN-POSTS ON OCEAN'S HIGHWAY.

II.

BASALT—*Continued.*

WE now come to outbursts, upheavals, and overspreading molten matter; to these we join subsidencies. None of these actions are directly related to the origin of basalt, but all of them are directly related to the varied conditions in which this rock appears before us. It is allowed on all sides that basaltic formations must once have been in a pasty or a fluid condition. We are told that the hard schists were deposited as mud or silt. If the silicious materials, of which these schists are composed, were capable of being converted into mud, how much more easy must it have been to make muds out of these schists, when it came to their turn to be reconverted into solutions, to mix with the increasing soft materials, all ready to form another mud. Mud has not been an attractive subject, our science gets rid of it as soon as possible, yet the phenomena connected with it are very numerous, very interesting, and all-important to our present subject. On looking along our sea shores we find frequent subsidencies of upper earth-masses into the soft mud or gault below. This gault is pressed or injected into the fissures of the subsiding mass, it is forced into the shape of pillars and dykes, and it is squeezed down through the ordinary water-runs beneath the sands, where we find it as thin interstratifying sheets. When the overlying sand is incapable of resisting the force of the pressure, it is forced up into banks or ridges, parallel to the line of subsidence. If the muds of to-day are liable to these actions, there is no reason why the muds of old should not have been under the same law. There may be differences in the constitution of the mud, or of the overlying and subsiding strata; but the law of gravitation is the same; so that if the mud or silt is unequal to sustain the weight of any overlying matter, then that matter must of necessity subside into the mud.

Subsidencies therefore do take place; they do force liquid, or plastic mud into overspreading sheets; they produce upheavals and outbursts of the mud into every possible shape allowed by surrounding matters. To this unavoidable system we owe the convulsions, the fractures, and the condition of many of our mountain masses. The cessation of volcanic action during the old red sandstone system was purely imaginative on the part of Mr. Page, but it will be obvious to any one, that when sand was in course of deposit, mud could not be; so that the subsidencies and their results did not take place. We will not be so dogmatic as to say that the Giant's Causeway is due to cold mud and pressure; there are many similar formations about the world, and if we allow that basalt ever was in a plastic state, there is no reason why it should not have assumed the columnar and prismatic form under a cold as well as under a molten condition. The crystalline condition of these columnar basalts has been brought forward as proof of igneous action. We have given good reasons why basalt, as it is, could never have been in a molten condition, and we believe that crystallization is only a proof of the presence of silex. Perhaps no experiment was more absurd than that by Sir James Hall, who sealed up his pounded chalk to prevent the escape of gases, and then exposing it to heat converted it into crystallized marble. He ought to have known that natural strata have no hermetical seals, so that his experiment was no criterion of natural action. It is a well-known fact that basaltic lava retains its heat longer than other lavas, but it has been a matter of wonder how molten basalt could have retained its fluidity, so as to run over many hundred square miles. We do not suppose that the great basalt sheets of America or of India ever were molten; but if they were formed of mud, then there is no limit to their extent, so long as the supply was under the law of gravitation.

Having thus briefly vindicated the law of gravitation, we have now to consider the results of contact between certain rocks. Hutton jumped to his conclusions because he wanted them; he had formed his theory

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before he went to the Grampian Hills, and he assumed that veins of one rock permeating another gave evidence of a melting process. No one has explained how this permeating action was carried on, and we are at a loss to understand how a soft molten matter could run into an unmolten rock. There is nothing in the laws of nature whereby we can solve this point; but there is a law under which the whole process is done without fire, and in default of any fire examples we may fairly assume that the granitic veins of Hutton were formed in the same way.

It is a very common occurrence in the fine sandy formations of eastern rivers to find veins of one colour and one character running into masses of other characters and colours; the heavier muds run into their lighter neighbours, assuming every variety of figure. The same results may be seen in English clays. Marbles are evidences of the same thing; so that, under these actions of the laws of affinity and gravitation, Mr. Hutton's veins required nothing out of the way to place them where he found them. On looking at calcareous rocks in many parts of the world, at slates and schists, we have seen that the silicious matter frequently runs from one part to another. In the Isle of Wight great masses may be found into which these percolations have taken place; by which portions have become so indurated as to withstand the ordinary denudating causes, and remain as hard rock after the destruction of that portion from which its silicious matter came. The same action is evident in the schists, where the silicious matter has run from one part into another, forming veins in one portion, and crystallized blocks in another. These are only different results of the same law exhibited in chalk, where the silex percolates from the sediment, forming a layer of itself: as no one supposes this is done by heat, so there is no proof that heat does the others. Fire is not needed for the petrifaction of wood, for the conversion of sponge into flint, or for the formation of agate: they are all cosmical alterations of matter due to the laws of affinity and gravitation. As fire is not wanted for the alteration of rocks, for subsidencies, or upheavals, for injections, squeezings, or contractions, or wrinkles, though it may lend a hand to each, or to all, we have now to show how true igneous rocks, such as lava, are connected with fire.

We have strolled on towards the carriage entrance of the gardens. Wide verandahs occupy both sides, their walls are covered with bold frescoes of extinct volcanos. Auvergne and the Venetian Alps are there, with no more fuel to keep up their once volcanic energy. The depths of the supposed fires are exhibited, according to fancy, as eight miles deep, twenty-five, thirty, one hundred, two or three hundred, two thousand five hundred, and the precession of the equinoxes goes on, without any reference to these diverse conditions, with its ordinary regularity. We think of the bold paintings of the infernal regions on Italian cupolas by artists dreaming of Dante or of Virgil. We see that the world goes on in its goodness and its wickedness just as it did before Virgil or Dante lived, and we recollect that no poesy, no philosophy can alter the laws of Heaven or of earth. In a dusty corner we find a design of Sir Humphrey Davy busy with potassium and sodium, his attendants are loading a van with alkalis; the coachman is ready to drive it round the world, to show the causes of subterranean heat and volcanic action. "Silica, alumina, lime, soda, and oxide of iron, substances of which lavas are composed," were all packed as evidence of the action, but, at the last moment, Sir Humphrey found that the horse "Hydrogen" would not come out of the Vesuvian stable. The team was incomplete, dust was thrown over the van, which became neglected in the corner. It is, however, shown that M. Abich "clearly detected the flame of hydrogen in the eruption of Vesuvius in 1834"; but Sir Charles Lyell had thrown a veil over the van and its load. If it had been brought out then, it would have caused much inconvenience; there were a great many emblazoned chariots and fiery steeds on sale, or likely to be on sale about that time; so, not content with the veil, Sir Charles borrowed a patent break from M. Foquè, who was "satisfied with the hypothesis of a subterranean sheet of fluid lava, to which water may occasionally gain access, central heat being invoked as the power by which the lower parts of the earth's crust are retained in a melted state," and who considered the quantity of "alkaline metals beneath all the active volcanos, which had given rise in each to a long series of eruptions, would be incredibly great." M. Foquè had had the audacity to measure by human finite figures the infinite results of laws which rule this globe; he put down the quantity of sodium required as at least "7,000,000 cubic metres." With the help of this patent break the chemical van was immovable; Sir Charles in his mechanical light phæton got to the bottom of the Andes, and other places of active volcanity first; he found that the existence of fused lava "cannot be doubted," so that his wheels have revolved well up to this time. We now consult him and others about the incredible quantity of sodium.

"Sodium exists in great quantities in the mineral kingdom..... Enormous deposits are found in England, Poland, and elsewhere"; it is "the leading saline ingredient of the waters of salt lakes and of the ocean." If it exists in places we know of, we may give other parts of the earth credit for containing some of it. Sir Charles Lyell tells us that "140,000,000 yards of lava were ejected from Etna in 1669; but this quantity was not equal to one-fifth of the sedimentary matter which is carried down in a single year by the Ganges." Can any one estimate the quantity of sodium carried down in one year from the animal fluids poured into this river from its populous banks? Again he says, "51,321,600 cubic feet of earth are carried off by the sea yearly from Holderness," and "one characteristic of the action of currents is, the immense extent over which they may be the means of diffusing homogeneous mixtures." There is no area of land that does not contribute to rivers some of the rain which falls on it. Sodium is perpetually increasing: it is impossible to estimate the quantity of it contained in the vast masses of earth yearly handed over to the sea, to compute the quantities passed to the ocean by rivers, or to calculate the places where the currents will gather the sodium together as sedimentary matter in the ocean. We are obliged to Sir Charles for enabling us to say that M. Foquè's "incredible," as applied to the results of natural laws, only stamps his followers with credulity; while if we depended on sodium only as the chemical cause of volcanic energy, we should be depending on a source of matter which is

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beyond the reach of measurement or of computation, and consequently capable of producing such results as naturally depend upon it.

We have shown above, that in the recent or post-tertiary system all the volcanic products are lava; in the tertiary nearly all are of true volcanic origin; below these no lava is found till the silurian system is reached, while below that there is none. As the chemical causes for the production of fire and heat within the earth must be constantly increasing with vegetable and animal increase, we may say that the situation of lava in the subterranean regions is a *primâ facie* evidence that it was not melted by heat coming from below the sedimentary schists; while the present situation of lava on the surface is a proof that the heat is caused by chemical action in the deposits of the earth. So that No. 26 may be a true picture, and No. 9 may have a greater range than Mr. Woodward supposes. We have, however, something more to say of local heat before we can say that the theory of Sir Humphrey Davy is an absolute certainty.

Passing back by the other side of the gallery, we find some interesting sketches taken by Sir Charles Lyell, whilst travelling in his light phæton over the very causeway on which he thought it necessary for Sir Humphrey to use the skid.

(No. 42.) Hot springs are important to geologists, for the "quantity and quality" of the earthy materials thrown up.

These materials are—

(No. 43.) "Carbonic, sulphuric, and hydrochloric acids, combined with bases of lime, magnesia, alumina; and iron, chloride of sodium, silica, and free carbonic acid, as well as nitrogen, are commonly present."

We cannot help wishing that Sir Charles had devoted a little more time to these quantities and qualities, for it must have struck him as strange, that waters having fallen in with one heating cause, in some unknown place, should fall in with another before reaching the surface; but Sir Charles had no hesitation, he drove on—

(No. 44.) "When new combinations take place, some of the gaseous, earthy or metallic ingredients of the springs may be intercepted in their upward course."

We consider this picture and No. 9 to be of the same school; and we venture to place the artists among the first philosophers of our times, in finding out that water became heated in subterranean regions by an unknown cause, before it ran up hill, on purpose to find a well-known cause of heat. We do not quite understand what is meant in this picture by "new combinations;" some must be for ever forming; but we have no occasion for them while old combinations produce hot water.

(No. 45.) Hot water is abundant "in regions where volcanic eruptions still occur."

The scene is true to life: the mountain vomits spasmodically; the hot water runs out constantly; it is assumed that the igneous causes are the same for both. The volcano dies away, the spring runs on; the origin of heat cannot be from the same place, because if one died so would the other; but as both fires were fed from the surrounding strata it follows that the slow eroding water has not used up its supply, while the fiercely eroding volcanic fire has used up all the igneous causes available to it. We find as we wander back some little sketches that will make the subject comprehensible.

(No. 46.) "The mineral springs of Cauquenes burst forth on a line of dislocation, crossing a mass of stratified rock, the whole of which betrays the action of heat."—*C. Darwin.*

The character of this rock is not given, but heat is shown to be in the region—

(No. 47.) "Two springs a few yards apart with different temperatures, the lowest with scarcely any mineral taste."—*Ibid.*

The taste is some proof of heating cause, so that the less mineral, the less heat; but

(No. 48.) "In both these springs—in summer the water is hotter and more plentiful than in the winter."—*Ibid.*

Darwin pondered over this unavoidable result of a natural law, till he found that

(No. 49.) It "can only be accounted for by the melting of the snow . . . . on a range of snowy mountains three or four leagues distant."

It was considered "a very curious" phenomenon, and taking it as he painted it there can be no doubt of its curiosity, or of its philosophic character—

(No. 50.) "We must suppose the snow water, being conducted through porous strata to the regions of heat, is again thrown up to the surface by the line of dislocated and injected rocks at Cauquenes, and the regularity of the phenomenon would seem to indicate that in this district heated rock occurred at a depth not very great."

As far as nature is concerned, the phenomenon seems simple and beautiful. The melted snow percolating the earth finds in it causes of heat, and its level through the Cauquenes stratified rocks, which betray the action of heat. As there is no melting snow in winter there is a smaller issue of water, as its subterranean erosion is not so great as in summer, the mineral taste is reduced as well as the heat. The only curious part of the phenomenon is that the naturalist of the 'Beagle' should have imagined any necessity for "thrown up water," when he saw that it was running down from the mountains. We look into our own pocket-book for a similar case—

(No. 51.) At Wuzerebai, near Tanna, Bombay, a number of hot springs, of varied temperature, rise by the side of or in the river bed: when the river is clear, these springs are clear; when the river is muddy, the hot springs are muddy.

The river waters find access to igneous matter on levels above these springs, that is, they run through strata containing the alkali of No. 9, or the metallic ingredients of No. 44, issuing from their different springs at temperatures due to the varied strength of the igneous causes they met with, or to the distances from the source at which they met them.

If we now look at the chemical theory of heat suggested by Sir Humphrey Davy—if we accept No. 40 as evidence against a molten condition of the interior, No. 26, as a dogma against the existence of

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primeval volcanoes—if we consider No. 44 and No. 9, we shall comprehend that the production of heat in the earth does not depend on depth, but on causes which may exist in any strata, as allowed by opponents of the chemical theory. There can be no error in this theory; there is no break in the system since it first began; it is conducted by natural laws from which there is no escape; its action is universal, but never similar. A great deal might be said here on the combination or constitution of bodies as well as on atomic theories. The subjects would lead us into boundless worlds, while all we wish to impress is, that whatever deductions we make from pictures or from facts are made on long consideration of nature's laws. They are all cosmical; their results are unavoidable, as every result must be emanating from laws formed by one Almighty Ruler. Man with his finite capacity has been unable to measure God's infinity; the for-ever-varying quantities and qualities of matter are not understood; Baron Richthofen has slightly touched upon them, but the subject is almost too extensive for one lifetime to see. Man cannot estimate the heating causes in his own body; he does not comprehend its wondrous chemical changes. Failing in these, it need not be wondered at that he denies to his mother earth the very qualities she has bestowed on him. We are fond of the miraculous and the unseen; the savage adopts his fetish as a god, and we, in seeking for causes of heat in this earth, have adopted the most prodigious theories. Our geological school began its career with caution and observation for its watchwords. We walk through our gas-lit streets, we sit by our warm fires, we travel round the world by the aid of igneous action, gases explode in our mines, cargoes ignite in our ships, we strike a light from the flint, we create heat by the mixture of water and matter, we ignite air by pressure; all of these are results of cosmical laws—the heat and the cold, the air and the water are never forgotten, never lost; something of everything that ever was is in the earth beneath our feet; the sunshine and the atmosphere are buried there, and while we daily use them, our schools have built up great structures from causes which they have not observed. If they wish to retain the confidence of the thinking part of the great communities around them they must reconsider the cause of heat i nthe earth.

We have wandered through long galleries of fair pictures, and notable sign-posts; each finger has pointed out its own path, every picture has represented the mind of its author as truly as the Holy Families represent the minds of Raphael and Sarto. It was not too great an undertaking for them to portray their comprehensions of heavenly gifts, it has not been too heavy a task for others to give us their interpretations of the universal laws; we may admire the pen as much as we do the pencil, but while we look at the pictures we have noted our thoughts run back to the sunshine of our oracular Brahmin.

The air, the rain, and the sunshine have formed these rocks; the glisten of the silex tells of the pure beginning, the dark materials tell of the impurities it has mixed with. We can trace the pure matter from the silicious schists of the early days into the covering of the diatom and into the blade of grass; it is the cement and the girder of this earth, it saturates the sponge and the wood, it mixes with all matter, it percolates through the hard rock, and runs through the cretaceous formations; it is hard, it is gelatinous; in early days it formed rocks with scanty mixtures, in later days it became scantier itself; but with all the impurities mixed with it basalt still holds some 50 per cent. of silex. These cosmical labours of mixing and reconstructing have been carried on in one unbroken chain, formed of most minute links from the beginning; in the midst of them our basalt tor and peaked spire, the mountain range and overspreading masses, the prismatic column vertical and horizontal, the dykes and blocky surfaces stand up before us as the sign-posts by the side of ocean's highway, self-evident proofs of a mud origin, self-evident contradictions of a fire origin, but containing in them such well digested matter that it can only be read by the context, as the tree is known by its fruit.

There is nothing new, nothing wonderful, but there is something very venerable in the subject before us. We fall in with a perpetual resurrection of old matter, the farther we look back the more pure it becomes, buried air and buried rain, bright silex, each at work, great examples of never-ceasing labour, all constituting the earth and the waters in the earth; the whole carrying out the orders of the universal Lawgiver; all so long at work, that wrinkles have been left on our fair mother's brow, formed by the sinking of soft matter by the side of the harder matter. These have remained as they are, evidence of the labour; those have been reconverted into mud for future construction. In these constructions there must be increasing causes of local heat; in the cosmical labours there must be subsidencies and risings—the latter cannot be higher than the former can sink. This part of the subject belongs to our mountain formation, we have used it only so far as it helped on our origin of basalt.

Well may the clear-sighted Werner have declared that basalts were precipitates from water; bravely and truly may he have said, in the face of opposing philosophy, that in the primeval world there were no volcanoes. The unwilling Hutton and many others have unknowingly given evidence of the truth of this much-abused dogma. Their sedimental schists rest on the face of what they supposed to be a fire globe; a globe supposed to be now in a cooling state. If in this condition it is still hot enough to keep up old and to create new volcanic energy, how much hotter must it have been when these schists were deposited by water a few million of years ago, with nothing between them and the seething interior? Yet these silicious rocks were not converted into lava, neither were their earthy impurities separated from them. This separation of matter from the molten lava is now the great criterion of melted silicious rock,* and the lava is the only true result of the volcanic energy. If basalt was ever erupted as a molten matter, why is it not erupted now?

In thus connecting lava with local fires of chemical origin from earth's deposits, we relieve basalt from a fire origin, while we provide something for the fires to feed on. We see the resurrection of the fuel; the sunshine is exhibited in flame, the rain in vapour, the air in the expelled gases, and the surface matter of yesterday, the illegible dusts of old time, are shown to us in the ashes, the erupted rocks, and the expelled

* See note, p. 189 of the August number.

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mud. The earth is an old mother, she never forgets anything. In these wonderful resurrections she shows us the great facts of former existence: the purity of the silex is exhibited to us, it is sent up again to be reconverted into dust, into gelatinous matter, to be again the covering of a grass stem, or to mix in all organisms on the face of this earth; once more to mix with all impurities, and to be buried again—every time with an increasing cause of heat, for this is a heating globe and not a cooling one!

Was the old man of the Syadra Mountains right, were his concentrated thoughts of planetary influence, and elementary action as producing cosmical effects properly expressed? Had he in his solitude read nature's laws from nature's page? If he was right; if we have sufficiently explained his meaning in the mutual relations of the elements to basalt, it must be recognized as a great sign-post on ocean's vast highway.

The rock is before us to answer for itself, its impurities are still as soluble in water as they were when it was deposited by water; these impurities are still as convertible into other materials as they always must have been under the influence of fire, while its pure silex is still there ready to be separated from the impure by the heat of an artificial or a natural furnace.* As the tree is known by its fruit, so we know the basalt by its results. If fire separates its constituents, it did not originate from fire. If some of its constituents are soluble in water, it is made by water sediments; these sediments were formed of the surface matter of yesterday, the dusts, perhaps the ashes, of what had grown on the earth, watered by the rain, nourished by the air, and warmed by the sunbeam; not a primeval rock, but a daughter of time.

In raising our sign-post, we have used with some familiarity those whom we have met on the same road; we have intended no more disrespect to them than we do to Raphael, while gazing with admiration on his Holy Family, and dreaming, in love, of the pure original. We believe the goal of our fellow-travellers is truth; there can be but one road to it. We desire no controversy on minute points. If any one can prove the existence of an internal fire down below the deposits of earth and water, we will accept the admirable dogma of Professor Tyndall, allow that our origin of basalt and our chemical heat are only mental pictures, and endeavour to philosophise over the unknown fuel of the interior of this earth. Till such proof is brought forward, we claim Werner as our guide, and Sir Humphrey Davy, with a few others, as our porters in search of the buried sunbeams in the gneissic schists of our mountain tops, and of our lowest deposits, testified to us in the light given out by the mineral oil from the lamp on the table before us, and exhibited to us all round the world in all deposits, as well as in the basaltic rock.

H. P. MALET.

* See note, p. 189 of the August number.

ERRATUM.

In our last number, p. 191, 2nd column, line 33, for *Pluto and Vulcan* read *Neptune and Pluto*.

DR. BECCARI'S TRAVELS IN MALESIA.

IN the last account I gave of this most enterprising traveller (*Geographical Magazine*, April, p. 20), I stated that he was on the point of leaving Makassar for Kandari, an unexplored region of South-East Celebes. He was, however, against his wish, delayed a considerable time at Makassar, owing to the difficulty of getting a *prahu* to convey him to Kandari, and of finding a suitable set of servants to accompany him there. We shall see by and by what a precious lot of scoundrels he fell in with and engaged. He was not idle, however; and although the letters he wrote in the interval do not contain any scientific novelty, he enclosed in them a splendid set of *camera lucida* drawings of Papuan heads. One especially is of great interest, indicating a very negro-like cast of countenance. He sent, moreover, the description and drawing of a most singular plant, a new species of *Myrmecodia*, which, as the rest of its curious kind, owes in a certain way its existence to ants. It was published lately as *M. selebica* in the sixth volume of the *Nuovo Giornale Botanico Italiano*, founded, as our readers are perhaps aware, by Beccari himself on his return from Borneo. Several months had elapsed and as no further news had reached us of our friend, we were growing anxious, when last mail brought in a long and most interesting letter, written at different dates, from Kandari, and addressed to Marquis Doria. I subjoin a full translation thereof, only omitting a few unimportant passages.

"KANDARI, *April 23rd*, 1874.

"I have received the 9th number (new series) of *Ocean Highways*, in which I find Giglioli's translation of the letter I wrote from the Aru and Key Islands. I must rectify a statement made therein, viz., that leguminose plants are wanting in the Aru Islands. It is true they are scarce, yet some are found there; bee-like insects are also found, but are also scarce, and true bees are entirely absent. Amongst the Aru Island leguminose plants is a species of *Erythrina*, which is fecundated through the agency of birds, and especially by small brush-tongued parrots, some of which have their plumage partly coloured of the same beautiful scarlet as the flowers of that plant. In the same number of *Ocean Highways* I have read a correspondence from Dr. Meyer on the voyage which he made to New Guinea. From what he says he appears to have been very fortunate in his discoveries and collections. The plan which he followed of going from the 'known to the unknown' was most certainly the best. Rosenberg, who also visited the islands of Geelvink Bay, stayed at Ansus, which is annually visited by *prahus* from Ternate, by the bird hunters of Duivenbode, and sometimes by those of the Bughis. Near the isthmus which divides Geelvink Bay from M'Clure's Inlet there is a (Dutch or German) missionary station. Dr. Meyer reckons the height of the Arfak Mountains at 7000 feet; but it is probable that Dumont D'Urville's calculation, 9500 feet, is nearer the truth. The road taken by the German traveller in the ascent of those mountains appears to be the same as that followed by D'Albertis, for he writes that at Dorei he found out that it was possible to make that ascent, not from Dorei, but from a small river more to the south. This river could be no other than that of Andai, where we stayed several months. Dr. Meyer also mentions cannibals in Jobie Island and elsewhere in New Guinea, and describes the inhabitants of Ansus as ferocious. My own informations would lead me to different conclusions; but Dr. Meyer has naturally had the chance of being better informed than I have, having stopped some time at those places. It appears to me to be a very general fact that travellers incline to depict natives worse than they really are; and this probably on account of

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misinterpretations to which ignorance of the language and habits of savages easily leads; and perhaps because some people fancy by so doing to give a richer colour to their own adventures.

"With much interest in the same number of *Ocean Highways*, I read the article 'A Cruise amongst the Cannibals.' We met good Captain Redlick, of the schooner 'Franz' at Sorong. He gave me some interesting ethnological objects from the Admiralty and Echiguder Islands. The massacre of part of his crew, which took place while we were at Sorong, without our knowing it, is not, I believe, to be entirely placed to the charge of the Papuans, but mainly to that of the Rajah of Salawatti, who is a great scoundrel. Captain Redlick says that the Sorong Papuans are cannibals; but that is certainly a mistake. He could not speak a single word of Malay, and on his vessel only one man could talk it and a little English."

"*2nd May.*

"I continue my letter, and shall begin by departure from Makassar. On the evening of February the 6th I went on board the *prahu* I had engaged—an old boat, which answered admirably to the description given by Wallace of the one which conveyed him to the Aru Islands: its burden was about 70 tons. Next morning we heaved anchor. Towards evening, on the 8th, we passed through Selayer Strait. In the Dutch charts which I possess ('Oost-Kust Celebes,' door A. C. J. Edeling, Batavia, 1865, with MSS. corrections up to June 26th, 1873; and 'Straat Mangkassar' Blad ii., 1871), the strait of Selayer in the southern passage, which is the most frequented, is not more than 3 geographical miles in length; while in the English Admiralty Charts (No. 942A) it is nearly twice that length. From what I saw, the latter is by far the most exact. The Dutch have a high opinion of their charts, and disparage the English ones; but in point of fact in so doing they disparage in many cases their own doing, for the English charts of these regions are mostly based on Dutch surveys, but always contain more recent corrections. I have seen large and detailed Dutch charts of the strait and roads of Makassar. One of the greatest drawbacks in such productions are the numerous errors in the nomenclature of places, mistakes which cannot be excused in those who are masters of the land; and it is a matter of surprise that the nomenclature is usually far more correct in the English than in the Dutch charts; naturally, taking into consideration the different orthography of the two languages. And I should here observe that it would be most desirable that in giving native names, the Dutch should follow the example of the British Hydrographic Office and of Kaper in his 'Marittime Positions,' viz., to adopt the Italian sound of vowels, which are admirably adapted for the transcription of the languages and dialects of the Malay Archipelago.

"I fain would make a further observation, which appears to me of great importance, viz., that in naming any geographical point not previously laid down, search should be made for the native name, and that given: for if these parts are little known to European navigators, this is not the case with the native sailors, who may often be most usefully employed as pilots, in which case the necessity is obvious of being able to name rightly the different places. I myself have often experienced the very great advantage of having written the native names on my charts. I never had the least difficulty of getting native boats to conduct me to any of such places. Cora's (or rather Di Lenna's) map of Galewo (Papua) Strait is an excellent instance in case. In the charts we possess of that part of the Papuan coast to the north of Salawatti, is an island named Jackson; its true name is Pulo Snapan. When Major Di Lenna surveyed those parts he laid down correctly that island, but under the impression that Jackson Island was another, he marked it also on his map. Now Pulo Snapan and Jackson Island are one and the same thing, therefore the latter should be eliminated from Cora's map (Cfr. *Ocean Highways*, No. IX., 1873). I found, as I said, the spelling of the names on the charts of Southern Celebes very incorrect. During my voyage to Kandari, sailing with natives, I have been able to correct the names of the places we passed, and of others further off, but well known to my travelling companions. Thus, the island in the middle of Selayer Strait, marked Sarontang on the charts, is called by the Bughis Sinkam-loe; Tana (or Tanah) Doan is used to designate a small island to the north of Selayer; it is, however, the true name of the latter, and is on certain occasions used in preference to that of Selayer; for instance, if a *prahu* is making for harbour, the Bughis have a belief that if the word Selayer is used instead of the more proper Tana Doan, the wind will blow off shore, and prevent anchoring. Recently a small additional chart of the Tiger Islands, to the south-east of Selayer, which are laid down dubiously on the English charts, has been published.

"Having passed Selayer Strait, we steered for the north of Kobiana Island (not Kamboena, neither Kambyna). The small island which is to the north of Kobiana is very near Cape Lora, which ought probably to be placed more to the west on the charts. We anchored there, taking in wood and water. We thence wended our way very slowly in the channel between Muna (not Oena) Island and the mainland; we then passed between Great Tobea and Tikola, which is not an island but a promontory; therefore there is no passage to the north of Tikola as would appear from the charts. The best channel is the one we followed, in which the water is never less than 10 fathoms, and no trace of shoals or sunken rocks, as is also erroneously asserted. The bottom is everywhere mud, and excellent holding ground. To the west of Tikola you will find on the charts Kolono Baai—a pleonasm, for Kolono in Bughis means bay. The island of Muna, which is marked as mountainous, is instead perfectly level, except a few very low hills. It is nearly entirely covered with coffee plantations: that shrub thrives well also on a plain, provided trees be kept to shade it. The coffee which is called Buton comes all from Muna. There is a pass between Little Tobea and Muna called the Tioro Strait. On the 22nd of February we entered the outer bay of Kangari. An island nearly shuts off the entrance into the inner bay, which is not at first visible; only the northern passage is practicable for large *prahus*, and even ships of greater draught would find a sufficiency of water. Dutch gun-boats visit nearly every year the inner waters of Kandari, where we arrived on the 23rd. The journey from Makassar had therefore lasted seventeen days, most of which I was laid up with a severe attack of fever, which had been incubating at Makassar, where the diet of the hotel did not quite agree with my spleen, which is becoming sensible to the protracted stay within the tropics.

"*8th May.*

"A chance occasion for sending off this letter has presented itself before I expected. I am therefore obliged to be brief. At Kandari I have rented a small hut on the top of a hill, in the midst of cocoa-nut palms, mangos, and anonas. I include a sketch of it. During the first days of my stay on shore I was unwell; the country promised little, and I have met with many difficulties. I was apparently surrounded by dangers on every side—in the air, fever; in the forest, head-hunters; at sea, pirates; in the village, hostile Bughis; and in my house, my own servants. Never before did I find myself amongst such a set of rogues. Fortunately, this occasion enables me to get rid of a couple of the worst, whom I have sent back to Makassar; and a great weight is thus taken off my mind. They had proved most troublesome. More than one *kris* was sharpened in my honour, and I accidentally discovered the plan they had laid out to revolt as soon as we put to sea. They pretended higher wages. But I determined not to be intimidated, and all they gained was greater

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severity, and an extra cleaning of my revolver. They were, besides, continually quarrelling amongst themselves. One fellow attempted to commit suicide, stabbing himself in the breast with his *kris*; and he well nigh succeeded, for I had the greatest difficulty in stopping the hæmorrhage. Another, half-drunk, attacked one of his comrades with a hatchet, and, had I not interfered, threatening to shoot him, and getting him out of the house, the other man would have been murdered. They are, moreover, thieves. Fancy in what nice hands I have fallen at Makassar. The Bughis of Kandari, like all the rest of them, only respect the Dutch through fear. If, therefore, my not being a Dutchman is one advantage, I profit through the wholesome dread they have of the Hollanders. But this is far from being the case with the Alfuros (wild men of the interior), who do not care a straw for the Dutch government, and hunt for heads with the greatest freedom and impunity. In the village hard by, during this month, they succeeded in getting two heads, and my cook ran a narrow chance of losing his in the same way. He had gone down to the spring to wash some rice, when five savages, armed with spears and *parangs*, jumped up and tried to intercept him. But he was quick, and managed to escape. As to my own personal safety in this place it is at present pretty good, and the halo of dangers which appeared to surround me on my arrival partly gone. My health is now good, which I owe in a great measure to the excellent water I get here, and the cold *shower baths* I can take in the forest, morning and evening, thus counteracting the effects of the sun.

"I have purchased a good boat of about ten tons burden, and I have formed a good crew, partly by redeeming *debt-slaves*. My intercourse with the Bughis chiefs of the village are excellent, and the fairest maidens of Kandari have been helping me to sew the sails of my boat. I have also earned the friendship of the rajah of the wild Alfuros or Tokkia as they are called here, with presents and by placing perfect confidence in them, allowing them to go freely in and out of my house. I have made an excursion a few miles inland to a place called Lepo-lepo, where I was able to study the habits and customs of the Tokkia. I cannot now enter into details on that subject, as I should be obliged to say too little from want of time. I shall only mention the general conclusions to which I have come, and which I believe may interest those who study mankind.

"The stay I made, in 1867, amongst the Kajans in the interior of Borneo, has given me the means of being able to recognise at once the nearly complete identity which there is between those savages and the wild natives of this part of Celebes. Had I not been detained writing this letter I should have gone to-morrow on a trip out of Kandari in my new boat. I must now wait in order to replace the two men I have dismissed; for I must not reduce my small crew on account of the pirates, who yet revel on these coasts in perfect freedom. I have just learnt that further north, at Tebunku (marked Sakita on the charts) cholera has broken out. I shall not sail therefore in that direction as I had intended.

"I ought now to say something about collections, but I am sorry to state that on that score I have not much to add, for various reasons. I have not yet been able to see a virgin forest in Celebes; around Kandari the trees have been cut recently, and the variety of plants to be met with in the new forest is small. This is mostly formed by a *Quercus* (oak) and a species of *Castanea*, besides a few *Ternstrœmiaceæ*, *Myrtaceæ*, &c. Large tracts are covered by the *Alang-alang* a species of grass, which grows very high. In some of the places recently denuded I have found Moluccan plants, and along the rivers Bornean species. As yet the flora of this country has not offered me any peculiarity. Amongst the native mammals, I have obtained a very remarkable species of wild boar, of which I send a sketch; a species of *Cuscus*, the *Cynopithecusnigrescens*, a *Viverra*, and a stag, which I believe to be *Cervus Kuhlii*. The Anoan antelope (*Anoa depressicornis*) is pretty common; but I have not yet been able to get a single specimen. Wallace is mistaken in asserting that the Anoan inhabits exclusively the mountains, and that it is not found together or in the same locality as deer. Here these last are very abundant, and the Anoan frequent the mangrove swamps, and often go down to the sea-shore like the stags to drink the briny water.

"Little indeed have I done as yet here for ornithology; but the birds are only just beginning to complete their moulting. A few Reptilia and some small and plainly coloured Coleoptera have been collected. Verily, from a naturalist's point of view, I have as yet met with little of interest in this country; but it has proved a most attractive place for an ethnologist. Having a seaworthy boat of my own, I feel very independent, and my future plans are very unsettled, for I can start for Makassar whenever I choose. In June a steamer from Makassar is expected here; I shall then perhaps be able to give you further news of my doings. I enclose in this letter a portrait of a young Tokkia. The head-hunters are after all not so bad looking as one would suppose; and the Tokkia maidens are still less capable of causing fright.

"The *prahu* which takes this letter has stopped on purpose to convey it to Makassar; thus I must conclude, with hearty greeting for all my friends, which I beg you will transmit."

I have scarcely time to add any comment to Beccari's letter, but I may mention that his future prospects are brighter than he is aware of. Hearing of his great anxiety to return to New Guinea in the coming winter, and that he was deterred through want of adequate means (the heavy expenses of his present and past journeys have up to the present been entirely defrayed by his private means) from doing so, the municipality of Genoa, represented by their enlightened Mayor, Baron Podestí, has come forward and placed at Beccari's disposal a sum sufficient to allow him to make a second and more prolonged visit to the land of the Papuas. By the time he next writes he will have received that bit of good news, and will probably leave Kandari to be able to start from Ternate in October or November. I am happy to add that Beccari's merits have been recognized by our Geographical Society, and one of the gold medals has been conferred on him, the other having been given to a second worthy friend of mine and famous traveller, Dr. George Schweinfurth.

HENRY HILLYER GIGLIOLI.

FLORENCE, *August 15th*, 1874.

A CONTRIBUTION TO CYCLONE HISTORY.

IN May 1871 a great cyclone swept across the Arabian Sea, of which we have some observations; and as all information on the subject of these phenomena is valuable, the present paper hardly needs farther preface, especially as it affords, in the case of one at least of the ships, an emphatic warning to seamen not to neglect the study of the law of storms, and also to act up to what they have learned.

At Karáchi, situated at the head of the Arabian Sea, and beyond the direct influence of these storms, it was obvious, on the 4th of May, that a great disturbance was taking place far away to the south, the indications being a high surf from south, and a very unsettled appearance of the weather. On the 6th and 7th a

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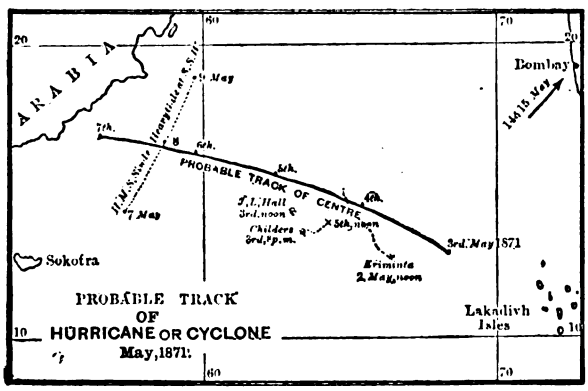
strong breeze from S.W. was experienced, attended by a rise in the mean level of the sea, causing very high tides, which did some damage on the 7th and 8th. The full moon was in perigee on the 5th. This was doubtless the wind from the S.E. quadrant of the storm, after the centre had passed to westward, far away south of the place.

It appears to have crossed the sea from near the north end of the Lakadivh Islands, in a W.N.W. direction, towards the Arabian coast, as shown in the diagram. Its violence was probably greatest in about longitude 65° E. The accounts given by the masters of three ships bound to Bombay which experienced it, were published in the *Bombay Gazette* of 15th and 17th of May, and appear instructive.

It is chiefly to them that attention will be drawn, but one sad casualty deserves prior notice. The steamship 'Collingwood,' from England to Bombay, left Suez on the 25th of April, and has never since been heard of. She did not call at Aden, and, allowing a speed of 9 or 10 knots, must have encountered the cyclone about the 5th or 6th, and probably ran right towards the advancing centre, where she foundered. There is no bad weather in the Red Sea at that season, and, had she run aground, something must have been heard of the wreck.



A steamer bound from Aden to Bombay, during the months in which these storms may be expected, observing indications of the approach of one, viz., gloomy, threatening appearance to S.E., with falling barometer, and blowing hard from eastward; knowing also that the track of all these cyclones is between N. by W. and W.N.W., would do well to consider whether she should not run to S.S.W. until the wind veers to N., and then pass round behind the storm, thus making a fair wind of it, instead of struggling on against the wind, and probably right into, or close to, the dangerous vortex. The cyclone months are April, May, June, October, November, and first part of December, but often years elapse without one occurring. In these latitudes, too, masters of ships straight from England must remember that one-tenth of an inch is a serious fall in the barometer.

The first of the three ships referred to is the 'Childers' of Liverpool, which, at 8 P.M. on the 3rd,* was in longitude 63° 20′, latitude 13° 35′; wind W.N.W., observed threatening appearance with vivid lightning in the S.E. quarter; barometer, 29.70; sea high from southward. She reduced sail prudently to lower topsails, and at 10 the wind had fallen light. At 11 a gale set in at E.; at midnight a deluge of rain fell, and, the gale increasing, his fore and mizen topsails blew away. *He then put the ship on the starboard tack.* Barometer 29.2. At 4 A.M. on the 4th the wind blew a complete hurricane at N.E., and from that time up to noon it was terrific, gradually drawing round to N.W. Several of the sails blew off the yards out of the gaskets, although extra lashings had been passed round them. By noon the wind was at N.W. by W. Barometer 29.2. The rain was very heavy, and also the sea, the tops of which blew over the ship in a continual spray.

At 4 P.M. the sky appeared to break a little; wind in heavy gusts from W. and W.S.W. At midnight barometer 29.35, wind at S.W., and moderating. At 4 A.M. on the 5th she ran to N.E. on her course, and at noon passed a quantity of spars in latitude 14°, longitude 64° 20′.

The master of this vessel reasoned quite correctly that the storm would pass to the northward of him; but why did he not heave to on the port tack, so as to "come up" to the wind, and head away from the centre? Doubtless his best course would have been to run to S.S.W., when he would probably have escaped the bad weather, and saved his sails, &c. It is true there is a natural disinclination to put the ship's head away from her port, but in this case, with such a low barometer, there could be no doubt about its being a cyclone, and to avoid such storms ought to be considered a positive duty, whenever practicable, and not a matter in which there is any option.

The second ship is the 'J. L. Hall' of Liverpool. She noticed at 4 A.M. on the morning of the 3rd that the barometer had fallen one-tenth, and was then at 29.53, with freshening wind at N.N.E., high, confused sea, and much lightning, and, in consequence, prepared for bad weather. Ship's position at noon—latitude 14° 13′, longitude 63°. At 8 P.M. the barometer had fallen to 29.35; gale steady at N.N.E. *Wore ship to north-westward on starboard tack.*

The morning of the 4th began with an increasing gale, and wind veering to the northward, and at 4 A.M., considering that a cyclone was passing to northward of him, he wore to the eastward; barometer, 29.20; wind at north.

At 10 A.M. it blew a hurricane, barometer 28.95, with very heavy sea running, wind veering to westward; at 2.30 P.M. barometer was at its minimum, 28.83, and wind at W. by N. From this time, when the centre was passing the ship, the gusts are reported as terrific. The lower maintopsail, the only sail set, was blown away out of the boltropes, although probably the strongest sail on board. The ship at this time was lying with her gunwale in the water, and her cargo of coals shifted. At 6 P.M. the barometer began to rise, and at midnight stood at 28.90, when weather had moderated, and sea was falling quickly. At 4 A.M. on the 5th stood to N.E., with a S.W. wind. This ship lost part of her bulwarks, boats stove in, &c. This ship, as is evident from the barometer, was closer to the centre. She made a mistake at first in heaving to on the wrong tack, but redeemed it when she found which way the storm was going, and afterwards lay to on the right tack. A

* Month throughout, May. Longitude E. of Greenwich. Latitude N.

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similar remark to that on the 'Childers,' about running to S.W., is here also applicable. It is the third vessel, the 'Eriminta,' whose account is interesting, as an example of what a ship ought not to do in a cyclone. It will be seen she had a narrow escape of foundering: she scudded nearly twice right round the cyclone, and escaped only by the fortunate chance of "broaching to" behind the storm, and remaining so, notwithstanding the efforts made to resume her race with destruction. Her account states or assumes that she got into more than one cyclone! and is, much abbreviated, as follows. It is the more remarkable, as it shows considerable knowledge of the theory on the part of the master.

At noon on the 2nd she was in lat. 12° 48', long. 66° 10', with threatening weather, and at 8 the next morning the ship was prepared for bad weather. The account says, "*I concluded there was a cyclone to the eastward of us, advancing to the N. W., and decided to steer to the S. W. to avoid its violence.*" This was quite correct, and one can only express surprise and regret the excellent intention was not adhered to. At noon on the 3rd the barometer had fallen to 29.50, wind N.N.E., and increasing and constant heavy rain. Careful preparations for bad weather were in progress. At 2 P.M., the ship was kept S.S.W., and had this been adhered to, all would have been well, but at midnight the wind had veered to N.N.W., barometer 28.90, and the ship was kept scudding *before the hurricane*, under bare poles, and going at a frightful rate, the following being the state of things:—Sea mountains, decks and cabins flooded with water, all hands on deck, at the wheel, relieving tackles, some at the pumps, when possible, and baling out water; at 10 P.M. the lower foretopsail and foretopmast staysail blew away, knocked some of the planks off the bulwarks to let the water run off.

At noon on the 4th they had made a *complete circuit in the twenty-four hours past, always keeping before the wind and seas.* The veering of the wind was by N.W., S., and E. round to N. again; they were then steering S.S.W. again, the barometer, 28.60, showing an approach to the centre. It is described as "a fearful gale, many of the sails beginning to blow away from the yards out of the gaskets; impossible to do anything to save them. All the running rigging about the decks washed overboard and to pieces, and the upper portions of it streaming away in the wind. The spray flying over us and the constant rain hiding the forward part of the ship from view on the poop; ship going from 12 to 14 knots and behaving well, *although I was in constant dread of broaching to.*"

By midnight the hurricane was really terrific, the wind had now veered to W.N.W. in its second circuit, barometer at 28.10. At 4.30 A.M. on the 5th the barometer stood at 27.90, the wind raging with all its former violence from W., the approach to the centre being fearfully indicated by the barometer. At 5.30 A.M. the ship broached to, and after an ineffectual attempt to resume the dangerous scudding, "*I decided to to let her lie.*" The danger was fortunately over, for the centre must have borne to westward of north, and was travelling rapidly to W.N.W. At noon the hurricane began to abate, the wind having veered to S.E. (? S.W.) barometer 28.50, rising fast. After broaching to, the ship was left a wreck, the mizenmast having been cut away when she broached to, in the attempt to get her before the wind, carrying with it the main top-gallant mast and yards. The bulwarks and railing stove in, also front of poop and forward house. "The lee side all under water, and our uncertainty whether the ship was filling with water, together with the roaring and screaming of the wind, the mountainous sea, and driving spray, created a scene that can scarcely be realized by any who have not experienced the same."

At 4 P.M. on the 5th they got to work at the pumps, and got the ship clear by 11 P.M.; they then proceeded to clear away wreck, and at noon on the 6th got the lower maintopsail set, which was the only sail left of our best suit that was fit to set." Latitude at noon 14.53, longitude 62.25, drift in three days 153 miles N.W. Barometer 29.30.

Another ship, the 'Louisa,' which left the Mauritius for Bombay on the 10th of April, probably foundered in this hurricane.

Other observations have not been traced, except the following: From the 7th to the 9th, the steamer 'Sind' had a tremendous gale at S.S.W. and scudded before it as shown on the diagram, this was probably a blow out of the back of the storm after it had passed to the westward.

The steamer 'Apis' left Bombay on the 2nd, met with a cyclone on the 6th, was in it two days, during which time her fires were put out; she arrived at Aden on the 15th, but no particulars are given.

A storm is reported down the coast of Malabar, about 4th or 7th, with southerly gale and strong northerly current; it is therefore probable that the storm had its origin near the north end of the Lakadivh group.

In Bombay bad weather seems not to have been experienced until the 14th and 15th, when a S.W. gale with rain occurred.

The relative approach of the three ships to the vortex may be estimated from the barometric depression.

'Childers'	29.2
'J. L. Hall'	28.83
'Eriminta'	27.90

The narrative of the latter vessel gives no reason for departing from her original intention to run to S.S.W.

THE TRAVELS OF JEROME CARDAN IN SCOTLAND.

THIS crack-brained genius is, or used to be, known, by name at least, to a multitude of schoolboys, from that name having been bestowed on a mode of solving cubic equations, which was none of his. Most of those boys probably have had no occasion to make further acquaintance with him; some, however, certainly must have been glad to do so through Mr. Henry Morley's life of him, a work which I have not seen for many years, and which was not indeed on a level with that other delightful history of his more estimable hero Bernard Palissy, but which was read with enjoyment in those pleasant days before the Indian cataclysm of 1857, when John Company yet reigned and brave Dalhousie governed. Of late years I have had occasion once or twice to turn to the dusty shelf of a public library which groans under the ten volumes of Cardan's works, and I have extracted from his

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treatise *De Rerum Varietate* (which might be rendered, "concerning things in general") such passages as touch on his visit to Scotland, a country then so little known to Italians, and not very much known to them now. Cardan's fame, however, had travelled to Scotland, and especially it would seem that of his medical skill. Hamilton, Archbishop of St. Andrew's —*Amultho* as Cardan Latinizes him—desired his advice for an asthmatic complaint of many years standing, and inveigled him to Lyons on the pretext of meeting him there; thence to Paris; and thence, after much reluctance, to Scotland, where he passed some months in the year 1552. It is not always easy to tell when he is speaking from information gathered by himself, and when copying from the Scottish History of Hector Boece, whom he sometimes quotes by name. No library within my reach will furnish Boece's History, and I must take my chance of stumbling on such second-hand matter.*

Though he was there in the summer he found Scotland a bare and gusty land, "*tota ferme sterilior*," abounding in lakes and mountains; and the wind used to blow so fiercely, that at a certain place that was not ten paces wide, it was impossible to pass except by running across, a feat to which stout young fellows used to challenge one another as a contest of strength.

Some good things were produced in this bleak land however; and one of these was salmon. "The true glory of fresh waters," he says, "may be said to consist in two *genera* of fish, the trout and the sturgeon. Each of these embraces many species, but the most illustrious is the salmon, which we have often eaten in Scotland." Another delicacy consisted in certain game-birds, but his account of them is not without perplexities.

"In Scotland they have the *Avercalzie*, which is found nowhere else. The name means in their tongue 'Horse of the Woods,' for the call is like a horse's neigh. The bird is somewhat bigger than a crow (!), and feeds only on the buds and tender leaves of the pine; there are also cocks of the woods, which feed on the leaves of broom (? *cytisi*); both kinds are excellent eating, for we have often partaken of them. And they feed on the heather yet more than the broom." His under-estimate of the size is extraordinary if he had really eaten the capercailzie; perhaps *corvi* is a mistake for some other word, but no probable one occurs to me. He appears to be quite right about the *name*, for I find in the English Cyclopædia the following quotation from Pennant: "This species is found in no other part of Great Britain than the Highlands of Scotland north of Inverness. It is there known by the name of capercalze, *Auercalze*, and in the old law-books caperkally—the last signifying the *Horse of the Woods*." Cardan's other bird—*Gallina silvestris*—it was impossible to render literally according to gender, for he evidently means a black-cock. He has also a paragraph about a rare shy game-bird, sometimes found on the banks of the Tweed, with plumage and meat not unlike those of the partridge, but bigger than a swan; the natives called it *Gustard*. I know not if this is a genuine form of bustard or a mere error; the passage is probably from Boece.

* See for the following passages *De Rerum Varietate* capp. 1, 4, 6, 16, 23, 24, 33, 34, 36, 37, 97.

Another *friandise* which he tried in the north was apparently not so acceptable as salmon and capercailzie. After rehearsing the story of the clack-goose, or bernicle, from Boece, he goes on:—"There is another kind of goose found on a rock near the Isle of May; it is called *soland:* perhaps Pliny's Sea Eagle. They come in spring, and bring such a quantity of sticks as to supply sufficient fuel to the garrison. Men turn them to this account, and also take from them the fishes that they catch—and these are the biggest and best!—whilst the birds go and fetch others and show no resentment. But this is a small matter! for they patiently endure their young, as well as their nests, to be taken from them, and make no disturbance, neither does this drive them away. They have quantities of fat under the skin; this is used for dressing wool (viz., for spinning? *hac lanas inficiunt*). In a certain small gut, also, they have another kind of fat, which is excellent for pains in the hip-joint. The bird itself is very like a goose, but when I was eating it I was sensible that it smelt strongly of fish. The bird is certainly a wonderful example of patience, and, so far as the Scots know, it is found nowhere else; but it must, of course, pass the winter somewhere or other. The profit it gives is manifold—viz., from sticks, feathers, fat, and young ones—and it is said to amount to 500 golden crowns yearly."

Scotch ale met with his approval—*hala* he calls it. It seems to have had the luscious character of the Scotch ale of our own youth, now, I suppose, extinguished, and deservedly so, by the wholesomer popularity of bitter beer:—"The *ale* which is made in England and Scotland is much pleasanter drink than beer (*zethum*); insomuch that I remember, when I first entered Scotland, drinking some that reminded me of sweet white-must; in fact, there was no difference, except that the ale left a more bitter and less pleasant aftersmack." After describing the manufacture, he adds—"It differs from beer *in the omission of the hops*."

He has not much to say of vegetable products. We sometimes in Scotland talk big about the ancient forests that once were, but are now swept away. Cardan's view, however, is, it must be confessed, very Doctor-Johnsonian. After speaking of the Orkneys, and their treelessness, he says—"Should it be asked, as it well may be, why there are no trees in Pomonia, I must reply that it is no wonder, since this happens even in Scotland, and in many places thereof trees are cherished with much nursing, as we should cherish an orange tree (*Arbor Medici mali*) or some other exotic." But this nursing was sometimes diligent and successful. After quoting passages from ancient authors on the beauty of the *platanus*, he proceeds—"Now it is a surprising thing that this tree, which is so neglected in modern Italy as to be hardly ever seen, is, through care and diligence, very common in England and Scotland. I counted in the shrubbery of the monks of St. Augustine, in the vicinity of Edinburgh, more than twenty plane-trees, some of them more than 30 feet high, and yet the climate is a very cold one. The thing is due in part to diligent care, but in part also, I fancy, to the vicinity of the sea, which tempers the severity of winter. I think they take a special delight in that tree, because its foliage is so like vine-leaves; indeed, when I first saw the young shoots that had been planted, I thought those Scots were actually

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growing vines! 'Tis like lovers, who delight in portraits, when they can't have the original."

A question suggests itself—Whether these trees at the Edinburgh monastery were the real *plane (Platanus orientalis)*, or only the species of maple commonly, but erroneously, so-called in Scotland *(Acer pseudo-platanus)*, and still more erroneously called in England "sycamore."* From Cardan's speaking of planes as so common in both countries, we may well suspect that they were really the maple in question, the more so as the Scotch monks, no doubt, would call them planes. Pliny says that the plane in his time had penetrated even to the land of the *Morini*, a people on the Calais coast, or as Ph. Holland gives the passage in his manner—"The very plane, brought first over into the Island Diomedea . . . . from thence translated into Sicilie . . . . but now it is caried as far as Terwin and Tournay in France . . . . insomuch as people that will but walke and refresh themselves under the shaddow of it must pay a custome therefore unto the people of Rome." A late German writer expresses a doubt about this, like that which we have just expressed as to the Platanus in Scotland, and suggests that it was the *Acer-Platanoïdes* (or Norway Maple of our gardeners), though possibly he intends the same tree that has just been mentioned *(A. Pseudo-platanus)*.†

An observation that Cardan makes incidentally regarding thistles in Scotland is somewhat remarkable, and if it were true would reduce the national motto and emblem to a very empty brag. Nearly all of them, he observes, were without prickles!

Sheep with four horns, he says, were frequent; not like those that he had seen at Milan, for the Scotch ones had one pair curved and the other pair straight. The phenomenon is certainly not a common one now in Scotland.

In a passage on the Hebrides, Orkney, and Shetland Islands, he speaks of the Shetland ponies, "*equi exiles et asinis quasi similes tam patientiâ quam magnitudine.*" The furthest of the Hebrides towards the north, he says, was *Istlandia* (a name on which my friend Mr. Major would have much to dissert); but, he adds, it was scarcely to be counted among the Hebrides, being so big. In that island bread was made from meal of dried fish (like among the Arabian Ichthyophagi of Strabo and Marco Polo). This is perhaps out of Boece.

The nature of both soil and stones in Britain is, he says, so bituminous that not only are there stones that burn, but a kind of earth also with heather roots in it. Beyond the city of Newcastle he found this kind of fuel preserved in stacks. It was used not only for kindling fires, but for roofing houses in place of tiles. The very soil of Britain *used* to shake under him as he rode, as when he travelled with Hamilton to *Lisco* (Linlithgow?). The cause of this was not any hollowness under the soil, but because the soil itself was of that black nature like an empty fungus. This soil also is burnt, and both of it and of the stones which are so abundantly consumed in Scotland, the price is much lower than that of firewood in Italy.

There can be no truth, he observes, in the theory that gems are produced by heat of climate; for, cold as Scotland is, it produces lapis lazuli *(cyaneus?* perhaps sapphire), and also diamonds and carbuncles, especially in the neighbourhood of Glasgow, a town in the district of Clydesdale (*Gludisdalia*), adjoining Argyll (*Argadia*), the most westerly province of Scotland, and nearest to Ireland.

"Pearls too, it is plain, may be found in any part of the ocean, for we know how great is their abundance in regions of the south, and here also in Scotland, under the pole, they are found in large numbers. I remember seeing upon the head of a damsel in Edinburgh, the daughter of Thomas Thomson [*Tonson;* it should surely have been Tammas Tamson] a wreath of about 70 Scotch pearls, all of a size, and that size remarkable. They are equal to the Indian pearls in roundness, whiteness, and purity, but the latter surpass them in size and splendour: for the biggest Scotch pearls are scarcely ever larger than the nail of the little finger . . . . . I have also seen these Scotch pearls at Milan, and the price put on them was not contemptible, though not so huge as that put on Indian pearls."

Here we conclude our extracts with one note that Cardan made on his way to Scotland. When at Paris, he went to see the church of St. Denis, and in this he found the horn of a unicorn suspended. It was let down for him to examine, and he found it so long that he could not reach the top of it with his arm stretched to the full; it was very slender and taper, and marked by a series of bands rising spirally from base to point.

This was evidently the tusk of the sea-unicorn or narwhal; and it is a curious fact that this has from time immemorial been confounded with the horn of the genuine monoceros, viz., the rhinoceros, and has mainly assisted in developing the fabulous unicorn. We trace the confusion in Aelian, who says that the horn of the monoceros or *Kartazônon* (the Arab *Karkadân* or rhinoceros) was not straight but screwed (*Hist. Anim.* xvi., 20). The mistake may also be traced in the illustrations to Cosmas Indicopleustes (6th century) from his own drawings. A mediæval drawing, showing the quadruped with an evident narwhal horn, may be seen in my *Marco Polo* (ii., 234). And that accomplished traveller Pietro della Valle, relates how, when a passenger on board the English ship 'Whale,' Captain Nicholas Woodcock, at the mouth of the Persian Gulf, on his way to Surat, in 1623, the skipper showed him a piece of unicorn's horn that he had found on the coast of Greenland; this was like old ivory, hollow and smooth within, and twisted. Captain Woodcock knew it to be unicorn's, both because he had proved its virtues against poison, and because it answered to the description in authors. Della Valle could not agree on the last point, as he remembered that Pliny described the horn of the unicorn or monoceros as *black*. Both were right. The unicorn supporter of the royal arms still carries for a horn the twisted tusk of the narwhal.

H. YULE.

* An error which has begotten another, viz., that several travellers in Persia—among them, if I remember rightly, both Arthur Conolly and Baillie Fraser—constantly call the *Chinár* or Platanus "sycamore."

† *Pliny*, by Philemon Holland, Book xii. ch. 1 (I. 358); *Hehn, Kulturpflanzen und Hausthiere*, &c., 1870, p. 204.

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IMPRESSIONS OF JAMAICA.

CHAPTER III.—KINGSTON AND BLUNDLE HALL.

BLUNDLE HALL is a type, or I should rather say the archetype of Jamaican hotels or inns. Strictly speaking, there is neither inn nor hotel on the island, if we take our homely notions as the test of nomenclature; but the "halls" are sort of boarding-houses which fill the void; and Blundle Hall is not only the biggest but the best of those peculiar institutions. It stands, I hope, like Scotland, where it did; and it stood, when first I set foot in its verandahed shade, on the right-hand side of the way going up that long road from the wharf which passes the eastern end of Harbour-street, where the large guinep tree flourishes. There is something very stately, solid, and enduring in the noun-substantive "Hall"; and if a stranger who had just landed at Kingston were to set forth on his unassisted search after some ideal mansion answering to the name, he would most likely pass by Blundle Hall without regarding it. Still the place has a fairly comfortable look of hospitality, which well bespeaks the good entertainment within. In one respect, too, it resembles a hall of the oldest Saxon character, in its having a courtyard. Farther than this, likeness there is none. Blundle Hall is built, as are most of the habitations in Jamaica, on a brick foundation which stands about 7 or 8 feet, perhaps more, above the ground, and which, having a concrete or earthern floor of its own, is usually panelled off into a spacious bath-room and two or three humble offices. The superstructure of dwelling-houses in the British West Indies is in nearly all cases wood, and wood alone. Glass windows are rarities, the jalousie blind being better adapted to the purpose of a tropical casement, which is to keep out the sun and the rain, and to let in the air, with so much tempered daylight as is necessary. Many Jamaican houses have, and Blundle Hall has, what is erroneously called a "piazza"; that is, a covered gallery or alcove between the penetralia of the dwelling and the outer air. In this gallery it is good to lounge in rocking chairs or to recline in grass hammocks, slung from pillar to post, when the burning heat drives us to seek out cool and shady places. Ice, for the unlimited supply of which necessary an extra charge of twopence a day, at the most, is made in your bill, is freely used, as a matter of course; and one of the delights most commonly associated with the piazza is a glass of cold lemonade, skilfully concocted with the juice of green limes, which have been freshly plucked for the purpose from a convenient tree. It is usual for the butler who supplies us with this nectarean draught, to hang across the rim of the goblet a long curling ribbon of peel, whose fragrance alone is a refreshment.

Both back and front, Blundle Hall has its covered galleries, or "piazze," if we may help to perpetuate the mistaken term. The business of eating was chiefly conducted in the verandah-like apartment, approached by a flight of wooden steps from the sandy street. Blundle Hall is the place for a regular old-time planter's breakfast. The planter's own particular dish, as common throughout the year as rashers of bacon in England, is salt-fish and akee, the fish being Newfoundland cod, which is also the cheapest food among the negro labouring class, and the akee being a useful fruit which was brought into Jamaica from the West African Coast in the slave time, and is not very unlike a hard boiled egg in appearance and flavour. Ox-beef, freshly killed, usually makes its appearance in the form of huge steaks, which are of course tough, but somehow not quite *so* tough as might be expected, considering that the animal was alive half-an-hour before breakfast. There is in Jamaica a fruit called the papaw, a few drops of which, squeezed over fresh meat, makes it tender; but the action, which seems to be that of the gastric juice itself, disintegrates the food to such a degree as to render it repulsive to most palates; and therefore I am not surprised that the papaw is rather out of favour with Jamaican cooks. Any expedient for keeping fat dishes from chilling, in that wonderful climate, would be a greater boon to the dainty eater than the means of making hard meats easy of mastication. Our fresh fish, at the Blundle Hall breakfasts, was almost invariably deep-sea snapper, of which it is quite possible to grow tired in time. Only as a treat was the incomparable calipiver, a firm white fish that combines all the virtues of salmon and mackerel with a rare zest peculiarly its own, sometimes served up to us at the morning meal. The abominable turtle-steak never failed to make its appearance. This meat, which in a solid state is deservedly scorned by the poorest negro, is only fit to be expressed in soup; and I need hardly say that no "stock" is so fine as that obtained from the coarse fibrous flesh of the turtle. Oddly enough, the art of making turtle-soup is very little practised or understood in Jamaica. Only at the tables of Sir Henry Storks and General O'Connor did we get such turtle, thick and clear, as would have made the estimable Mr. Painter, of Leadenhall Street, bilious with an artistic envy. But, indeed, Sir Henry had brought with him from Malta, or, rather, had been followed out by, a cook; French, I believe; who was truly a genius. It was this great creature's praiseworthy habit to study the dishes of every country he visited, and to better the instruction, as only a born cook could do. More than one artfully refined luxury of Maroon gustative tradition made its appearance on the Governor's table, during that unsettled time. At Blundle Hall one had no such recondite cookery; but all was very good, and so various as to be on that account charming. We were never without cassava cakes, a delicacy the more enjoyable because of the frequent philosophical reminder that the root from which they are prepared is unwholesome, nay, some go as far as to assert, virulently poisonous. That respectable botanic authority, Dr. Darwin, gave it as his opinion that the maniock or cassava is rendered harmless by the heat it undergoes in being made into bread, and not, as is popularly imagined, by riddance from its superfluous juice. Sir Hans Sloane also declared that the dreaded cassava juice, however acrimonious in its raw state, becomes, when boiled, as innocent as whey. At all events, the thin crisp cakes made from the rounded root, and roasted on a griddle, may be eaten with no less impunity than relish. We had yams, of course, and fried plantains, nor was the sweet potato often wanting for those who preferred it to yam. Of this fine root, there were two kinds within my cognisance, one as yellow as maize-meal, the other as white as wheaten flour. Carefully baked, the yam is a passable

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vegetable, more nutritious, I believe, than our British grown potato. There are three delicacies native to Jamaica, but of aristocratic rarity throughout the island, so that we seldom or never saw them at a table d'hôte. I speak of the black crab, the mountain mullet, and the ring-tailed pigeon. It happened that these among animal food, and the mango among fruits, were as much out of season when I was in Jamaica, as anything ever is in that little-varying climate. But I tasted them all. Of mangoes there are many kinds, every one of which was brought to the West Indies from the East; for, indeed, scarcely anything prized in Jamaica is indigenous. The only mango free from a turpentine flavour is the fruit called Number Eleven; and this is a pleasant and refreshing morsel. The other mangoes, to what number beyond eleven I know not, are only good for pickling. The black crab is a land species of crustacea, as small as the smallest river crabs found in England. In cooking, three or more black crabs are wanted to fill one shell with properly picked and prepared meat; and the dozen shells, comprising the edible parts of three or four dozen crabs, are baked and served hot. There is but one approved way, also, of cooking the mountain mullet, which is to wrap that marrowy fish in a plantain leaf, as the red mullet of the Eastern hemisphere is sometimes judiciously cased in paper. There are many ways of dressing the ring-tailed pigeon; but as I have so much of the naturalist in me as to forego the most tempting dishes of which any sort of pigeon is the staple, I can give no report touching this dove of doves in the West Indies. An edible which I had almost forgotten is the mountain cabbage, by which misleading name is called the tender top of a palm, excellent either when dressed artichoke-fashion or pickled. Sometimes we were indulged with a branch of oysters. "To a European," says Mr. Gosse, "it is a strange sight to see a grove of trees growing actually out of the sea, and his admiration is not diminished when he examines more closely the structure of these singular plants. The trunk of every tree springs from the union of a number of slender arches, each forming the quadrant of a circle, whose extremities penetrate into the mud. These are the roots of the tree, which always shoot out in this arched form, often taking a regular curve of 6 feet in length before they dip into the mud. The larger ones send out side shoots, which take the same curved form at right angles; and thus, by the crossing of the roots of neighbouring trees, and of the subordinate roots of each, a complex array of arches is produced, on which one may securely walk for hundreds of yards, probably in some places for miles, about 18 inches above the mud, or above the surface of the water when the tide is in. The average thickness of these natural bows is about an inch, and if stretched straight, they would hardly support the weight of a man; but their vaulted form greatly increases their strength, and though they frequently swerve a little under the foot, I never knew one break." This, to be sure, is a vegetable phenomenon; but much as it may surprise the European visitor to inspect the strange formation of these shrubs, I think he will marvel still more when he sees on a breakfast table a fresh, dark-leaved bough, the woody stem of which is encrusted with oysters, varying in size, but on an average about as large as those of Cancale or Ostend; of the same shape, and same depth of bottom-shell, and, I venture to assert, quite as delicious as any ever placed before the critical diner at the "Trois Frères Provençaux."

GODFREY TURNER.

TEA CULTURE IN JAPAN AS AFFECTED BY OCEAN CURRENTS.

THE cultivation of the tea-plant in Japan extends as far north as 39° N. latitude, which is three degrees further than the average limit. This peculiarity is due to certain meteorological conditions, which Herr A. B. Weber, a member of the German Geographical and Ethnological Society at Yokohama, has been at pains to investigate during a four years' residence in Nügata, a town on the west coast of Japan, just opposite the island of Sado. From his observations it appears that in summer the prevailing winds on the west coast are from the south and south-west, and that during their continuance a strong current sets northwards; but should these southerly winds increase to a gale, *on their subsiding* an equally strong current sets southward, without, however, any accompanying wind from the north. In winter time storms from the south-west are unfrequent, and so it is seldom that there is any exception to the regular set of the northward current.

Now in looking for an explanation of this abnormal feature, Herr Weber found that most of the maps and charts recognized the existence of a warm *and* a cold stream; on the other hand, Findlay's North Pacific Directory and Wyld's Map of Japan make mention of a cold current only. But Herr Weber's meteorological observations put it beyond a doubt that there is practically no difference between the temperature of the northern and southerly currents, and that with the single and remarkable exception above cited (*i.e.*, after the subsidence of a strong southerly gale) both streams are accompanied by winds of the same direction as themselves.

The explanation, like most problems in nature, when really grasped, is very simple. The breadth of the straits of Corea is greater than that of the Gulf of Tartary, La Perouse and Sangar Straits, all put together. Through the straits of Corea flows an arm of the warm Kurosiwo or Black Stream of Japan. When a strong south wind sets in and helps this current on, the mass of water is then too great to escape by the narrow outlets to the north, and it accumulates to such a degree that the difference between the ebb and flood-tide, which on the eastern side of the straits of Sangar is from 2 to 3 feet, is no more than 5 inches inside the Sea of Japan. This flooding continues till a lull in the gale admits of the pent-up waters rushing back whence they came. The southward current is thus but a *reflux* of the northward. The possibility of the existence of a cold current is out of the question, as, from all accounts, there is a constant flow from the Sea of Japan through the Sangar Straits, while again the mean temperature during three years was 10.48° Reaumur, or 55° Fahrenheit, which is above the average of places on that parallel of latitude. This abnormal warmth is, of course, eminently beneficial to the tea-plant, and for upwards of a hundred years the Etsigo plains, in the vicinity, have been famed for its growth.

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THE HIGHEST MOUNTAIN IN CORSICA, as determined by the triangulation recently carried on under Captain Perrier, has proved to be Monte Cinto. Its height is 2707 metres or 8882 feet.

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Reviews.

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MR. COOLEY'S PAMPHLET.*

IT is melancholy to find a ripe scholar, far advanced in years like Mr. Cooley, expending his powers upon barren and useless discussions. It is true that he has had much provocation, but he has also given provocation. The time has surely come, for him at least, to forget and forgive.

In the history of geographical progress during the nineteenth century, Mr. Cooley has won and will hold a prominent place. He was one of the original Fellows of the Geographical Society in 1830, and it is now nearly half a century ago since his earliest work, *The History of Maritime and Inland Discoveries*, was first published. In 1846 he planned and originated the Hakluyt Society, of which he was the first Secretary, holding the post until 1849, when he resigned owing to a physical infirmity. He edited a small but interesting volume, *Maynard's Voyage of Sir Francis Drake in* 1595, which was printed in 1849. In the same year Mr. Cooley did good service to Arctic research by the publication of Erman's travels in Siberia, including excursions down the Obi to the Polar Circle. But it is on the papers which have appeared in the pages of the Royal Geographical Society's journal, that his fame as a comparative geographer will mainly rest. In 1833 appeared his memoir on the tribes inhabiting the highlands near Delagoa Bay, with a proposal to send an expedition thither from the Cape of Good Hope. Mr. Cooley, in 1834, drew up instructions at the request of the Council of the Geographical Society, for Mr. W. Bollaert, who had undertaken to cross the continent of Africa, from Zanzibar to the West Coast. Unluckily, sufficient funds could not be raised, and the project was ultimately abandoned. Mr. Cooley's work, entitled *Negroland of the Arabs Examined and Explained*, was published with a map in 1841. It gave an entirely new interpretation of the various accounts found in Arab writers respecting the interior of the African continent, based upon the works of El Bekri and Ibn Batuta. Colonel Jackson, then Secretary of the Geographical Society, in writing of this work, says that its great merit and value spring from the author's critical accuracy in estimating the reliance to be placed upon his authorities as evidence, and from the cautious logical strictness with which he draws his inferences. Nor does the only merit of the work consist in its strict scientific examination of evidence. It also elicits positive results. Mr. Cooley has done what no author has done before him, in placing in a clear and satisfactory point of view the nature and extent of the knowledge which the Arab writers of the middle ages possessed of the countries of Africa south of the Atlas. His next important African work was *The Geography of N'yassi; or, The Great Lake of Southern Africa Investigated*, published in the Geographical Society's Journal for 1845, and followed by *Further Explanations in Reference to the Geography of N'yassi*, in 1846. The same subject was resumed in 1852, in a work entitled *Inner Africa Laid Open*, containing all the information that could then be found respecting the routes across the continent. In this series Mr. Cooley not only collected information from every attainable source, but reasoned from it, and constructed a map displaying very remarkable critical sagacity. It was here that he first brought to the knowledge of English geographers the journeys and discoveries of Lacerda, Gamitto, and the Pombeiros. In his map he places the river Lulua correctly as a tributary of the Congo, which was afterwards misplaced by Livingstone. But he makes the Luapula to flow into lake Tanganyika, and he delineates the Tanganyika and Nyassa Lakes of modern maps as one long sheet of water called "N'yassi, or the sea." Mr. Cooley still adheres to the accuracy of these delineations, and, at least as regards the Luapula, with some weight of argument. The separation of the lakes is a question which appears to have been decided by Dr. Livingstone having passed between them, and by his remains having been conveyed to Unyanyembe by the same route. Considering the date when it was prepared, Mr. Cooley's map of 1845 is a very remarkable production. It contains the district of Uvinza lately traversed by Lieutenant Cameron; the district of Monomoezi (Unyamwezi); the name Oyiyi (Ujiji); and the name Zanganyica (Tanganyika) as a town on the shores of the lake. The most glaring mistake is in making the Zambesi (Chambese) flow into the south end of the lake, instead of forming the upper part of the Luapula. Captain Burton, in his *Central Equatorial Africa*, frequently quotes Mr. Cooley's paper. The great explorer gives the comparative geographer the credit of having "determined the position of the great lake as early as 1845 in a most able paper," and says that Mr. Cooley's estimate of the marches from the coast to the lake was the closest yet made; Sir Roderick Murchison also bestowed high praise on Mr. Cooley's map, in his Address, in 1845.

In 1849 Mr. Cooley communicated to the Geographical Society a valuable paper on the "Regio Cinnamomifera of the Ancients," in which he directed attention to the eastern angle of Africa, and to the country watered by Haines's River. In the Society's journal of 1854 there are two notes by Mr. Cooley, one on the travels of Ladislaus Magyar, and the other on a journey across Africa from Zanzibar to Berguela, by way of Ujiji and lake Tanganyika, the Cazembe's capital, and Katanga, made by a native of Surat named Abdel and some other traders. In 1854 Mr. Cooley published *Ptolemy and the Nile*, in which, as Sir Roderick Murchison said, in his Address of 1859, "The acute scholar shows that the true Nile of the ancients was the Blue Nile, and that, according to Ptolemy, the great lakes were on the Equator." Such have been Mr. Cooley's principal published geographical labours.

In his present pamphlet he attacks the constitution of the Geographical Society, and rakes up feuds and misunderstandings with men now passed away, the memory of which ought also to be buried. Mr. Cooley may have had causes of complaint against bygone officials of the Geographical Society; but he ought rather to remember that his chief works saw the light

*Dr. Livingstone and the Royal Geographical Society. By William Desborough Cooley. (Dulau, 1874.)

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in the Society's Journals, and that successive Presidents and Secretaries, Murchison, Hamilton, Greenough, and Jackson cordially and generously ackowledged the value of his geographical services. Mr. Cooley's feuds with African travellers commenced, we believe, with his pamphlet attacking Captain Burton, entitled *Memoir of the Lake Regions of East Africa Reviewed*, which was published in 1864. Their latest development, before the present publication, was the somewhat sharp passage of arms between the veteran critic and the accomplished Consul at Trieste, which appeared in the *Ocean Highways* for June, September, and November 1873, and January 1874. Mr. Cooley there says that "the task of undeceiving the world is a heavy labour for one advanced in years, but that the provocation is great, and that Society is entitled to the whole truth and shall have it." The present pamphlet is, we presume, the result of the above announcement. Its object is stated to be "to examine the character and results of Dr. Livingstone's long-continued wanderings, so as to arrive at an exact appreciation of his merits as a discoverer, and to dissipate, if possible, the delusions which now obscure and disfigure his history." The Royal Geographical Society, as Livingstone's chief friend and supporter, receives very rough handling by the way.

It is unfortunately true that Dr. Livingstone, in one of his letters, did make an attack upon Mr. Cooley which was certainly unmannerly, and apparently unprovoked, and which the object of it characterizes as "an outburst of vulgar ribaldry." The critic is, therefore, quite within his right in making a searching examination of Livingstone's published maps and writings, and in pointing out any errors that he may discover. He does this with an unsparing hand, and with some success. But it is pleasant to find that Mr. Cooley is not blind to the good qualities of the departed explorer, and that he has the generosity to give expression to his opinion.

Mr. Cooley speaks of Livingstone's enterprise with the Makololo as highly meritorious, and characterizes the idea of leading a party of the Makololo to the Portuguese settlements as a bold and happy thought. He adds, "It is in his familiar intercourse with the untaught Africans that Dr. Livingstone appears to advantage; while other travellers speak of their black informants with contempt, he assumes no airs of superiority. He treats them as equals, sympathizes with them, and endeavours to give the proper direction to their enterprising spirit. His journey from the central region to Loanda, and thence to Quilimane, was boldly conceived, and in many respects skilfully executed. It was a very remarkable feat, and its merit was all his own."

We trust that Mr. Cooley will allow this more generous side of his judgment to have fuller play in his future writings. Of his great knowledge of African geography, and of his critical acumen there can be no doubt. We venture to express a hope that he will now set aside all angry personal feelings, and that geographers may yet derive further benefit from this eminent scholar's acquirements and critical insight, without being pained by unprofitable controversies.

FOREST FLORA OF NORTHERN INDIA.*

THIS flora with illustrations, published under the authority of the Secretary of State for India, has been expected for some time, and will everywhere be welcomed with great satisfaction. For many years it has been most desirable, both in the interests of forest administration and of geographic botany, that a forest flora of Northern India should be undertaken, Col. Beddows having lately completed the flora sylvatica of the Madras Presidency.

The late Dr. J. L. Stewart was in the first instance entrusted with the preparation of this work; but his health gave way, and the materials were made over to Dr. Brandis, who will be admitted by those knowing anything of forest matters to be the man of all others best fitted for the accomplishment of the task. His personal knowledge of Eastern arboreous vegetation was acquired when Conservator of Forests in Burma, and during a series of extensive tours since 1863, as Inspector-General of Forests to the Government of India. Many who remember the paper "On the Distribution of Forests in India" published in *Ocean Highways*, October 1872, p. 201, will acknowledge that Dr. Brandis brought no ordinary ability to bear upon the work he undertook. The *Flora* is an octavo volume of 640 pages, and is accompanied by a quarto volume illustrating seventy of the most remarkable trees in North India. The delineations are admirably executed by Mr. Fitch, the well-known botanical artist. In nomenclature and arrangement it resembles the Colonial Floras prepared at Kew. The typography is excellent, and there is a copious index of vernacular as well as botanical names and synonyms, which have been carefully verified.

The geographic limits of country included in this work embrace the Punjáb, the North-West and the Central Provinces. The northern limit is the treeless zone of the inner Himalaya, while to the south the territory is bounded by the open plain which skirts the base of the Satpuræ range. The area extends from about 20° to 35° N. lat., and from 68° to 84° E. long., and includes fertile districts as well as desert tracts.

In the preface the author states that the book "has been written not for botanists but for practical men, especially those who have the care of public forests in the different provinces of India," and it will certainly for a long time to come be used as a text book by forest officers, and by district engineers and English settlers for reference in all points relating to the distribution, size and economic value of Indian trees. The description of the most valuable timber trees contain the results of experiments made by the author and others as to the specific gravity and strength of the wood and the special purposes for which it is best adapted. To show the great amount of varied and accurate information condensed under each species we extract the remarks which follow the description of the *Prunus padus*, or bird cherry.

"Himalaya, between 4000 and 10,000 feet, at times ascending to 12,000 feet from the Indus to Sikkim. Occasionally planted. A widely-spread tree, from North and Central Europe, through Siberia to Amur Land and Kamtchatka, Caucasus, and Western Asia. Deciduous, the mature foliage dark green, turning red

* *The Forest Flora of North-West and Central India:* Commenced by the late J. Lindsay Stewart, M.D., continued and completed by Dietrich Brandis, Ph.D. 8vo. (W. H. Allen & Co.)
Illustrations of the Forest Flora of North-West and Central India. 4to. (London, W. H. Allen & Co.)

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before its fall, generally in autumn, sometimes as early as June. Fl. April-June to September. Fr. usually ripens July-October, remains long hanging on the tree.

"Usually found in mixed forests; thrives best in moist places, where it attains 50 to 60 feet, with a girth of 5 to 6 feet. Bark ½-in. thick, brown or purple, fairly smooth, a scurfy tuberculate grey pellicle peeling off. Wood, brownish-white, close and even grained, takes a fine polish. In France it is occasionally used by cabinet-makers. The fruit is sour, with a slight mawkish astringent flavour, but is much eaten by the hill people. In Sweden and Lapland, and some parts of Russia, the bruised fruit is fermented, and a spirit distilled from it. The unripe fruit of this species is often attacked by an insect, and then swells out into a curved hornlike excrescence; hence Wallich's name of *P. cornuta*. Similar excrescences are often found on plum-trees in Europe, particularly on prunes *(Zwetschen)* in Germany. The leaves are considered excellent cattle-fodder."

In concluding this notice we heartily recommend the work of Dr. Brandis, which is calculated in every way to fulfil the purpose for which it was written, and is a mine of exact information on forest questions gathered from many sources, and elaborated with the greatest care.

THE GERMAN POLAR EXPEDITION.*

FROM time to time we have had occasion to notice the successive volumes of this noble report of the German Expedition to East Greenland, or as its promoters, the Polar Committee in Bremen, prefer to style it—"The Second German Polar Expedition," expressing our opinion of the high merit which in general and throughout it possesses. Again, through the kindness of Dr. Lindeman, the Secretary of the Bremen Society, we have received an advance copy of the third volume of the work in question. When we last noticed it we had expected that the next volume would have treated of the geology, astronomy, meteorology, &c., of the expedition, but the exigencies of authorship have apparently compelled this volume to be delayed, for the one now before us is entirely occupied with the narrative of the voyage of the 'Germania,' after parting with the 'Hansa.' It is written by the different officers of the expedition, whom the Committee have permitted—and wisely too—to tell their own tales, and it cannot be denied by the most unfriendly critic—could such an ill-natured creature possibly exist—that though our German cousins, especially *savants*, do not excel in spirited narrative, that this portly volume of four hundred pages (pp. 291—699) contains as interesting a narrative of gallant deeds as have ever come before the public, though naturally it lacks some of that thrilling grandeur which attached to the tale of the ill-fated 'Hansa.' The general drift of the work has already appeared in this journal, and it is impossible to give an outline of its contents, except in such full detail that it would be unjust to a narrative which we hope may yet appear in an English dress, to skim the cream off in this manner. We will, therefore, content us with giving the reader an idea of the character of the contents, trusting that he may hereafter have the curiosity to make himself better acquainted with the work, in either its native or one of its—future—foreign dresses. The work, we might premise, is only the second part of the first volume, which we first reviewed in *Ocean Highways* for April, 1873, and in natural sequence comes before the zoological and botanical section, noticed in a recent number.

In Chapter I. Captain Koldewey and Dr. Pansch—names now very familiar to us—detail the voyage of the 'Germania' from the 21st July to the 5th of August.

Chapter II. is by the same authors, and treats of Pendulum Island, journeys on the ice, scientific daily work, the musk ox, &c. Pendulum Island, on which Sabine made his famous experiments to determine the figure of the earth, is a somewhat quadrangular piece of land, with two capes at either end, giving it what a naturalist would call a "quadricorn" appearance. The two most northern ones are Cape Buchenau and Hartlaub, the most easterly southern one is Cape Desbrome, while the westerly is yet without a name. The interior is very mountainous; Kirchenspitze (the "Church Spire") being 488.7 feet, Sonnenkopf, 616.2 feet, and Stufenberg, 466 feet in height, these elevations being determined by trigonometry. Pendulum Strait separates Pendulum Island from Sabine Island, lying more to the west. The latter is much larger, irregular in outline on the southern and north-eastern coasts, but little indented by bays on its eastern line. Hansa Bay is the largest indentation, while Germania Bay, in which the 'Germania' wintered, is close by Sabine's old observatory. Refersteinberg, Tafelberg, Kronenberg, and Kasenberg, are the highest elevations, being respectively 685.5, 415, 561, and 607.9 feet in height. Cape Neumayer is its most northern termination; Griper Strait separates it from the mainland. From this harbour on Sabine Island sledge journeys were made to the north, lat. 77°, a little to the north of a grim cape, which bears the name of "Bismarck," being reached on the 15th April, 1870. Shannon Island is described by Dr. Copeland and Lieut. Payer (now in joint command of the Austrian expedition, on board the 'Tegethoff'), while Dr. Börgen is the author of that of Pendulum Island. Chapter III. is occupied by Captain Koldewey in describing the voyage of the 'Germania' along the outer coast from 7th to 13th September, 1869; and Chapter IV. with a sledge journey up Fligely-Fjord, one of the numerous inlets which intersect the mainland of East Greenland, and with an exploration of the miocene coal formation of Kuhn Island (14th to 21st September, 1869). In the sixth chapter, Dr. Pansch gets, from a literary point of view, the expedition well into winter quarters on the 13th September, and winter may now be said to have closed on the expedition. All the life-like details which, to those who have gone through a like experience, must forcibly recall the past, are given—the covering in the decks, the warming arrangements, the foxes changing their coats from black to white, the bears sniffing about, wondering what is all the stir, the little lemmings, the dredging, and so on. The signification of some of these discoveries was pointed out when we noticed the zoology of the expedition in a former number. In Chapter VII. Lieutenant Payer describes a sledge journey to Clavering Island, and up the Tyrolese Fjords, which cut the Greenland Coast in lat. 74° 20', and like all the Greenland fjords, are dismally wild in winter—picturesquely beautiful in summer and autumn. A part of this chapter has already appeared in the Vienna *Wanderer*, and in Petermann's *Geographical Mittheilungen*, 1871, s. 129. Captain Koldewey adds some useful remarks upon

* *Die Zweite Deutsche Nordpolarfahrt in den Jahren* 1869 *und* 1870, *&c.*: Erster Band, Erzählender theil, Bearbeitet von den Mitgliedern der Expedition. (Leipzig: F. A. Brockhaus. London: Trübner & Co., 1874.)

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Arctic sledging, an art which may be said to have its home in England, so that any of his hints can add little to *our* knowledge of this necessary accomplishment of an Arctic explorer.

Dr. Pansch describes the life of the Arctic winter in Chapter VIII. An outline of this we gave in our first notice of the expedition. Dr. Börgen contributes in the next chapter an account of how the scientific observers were occupied during the long night, viz., in meteorological, magnetical, and tidal observations, and in a study of the Northern Light. Pansch has Chapter X. allotted to him to describe, in great detail, the first month of 1870; a very little goes a long way when men are trying to kill time during an Arctic winter and spring, and the learned doctor has not made the least of their daily life.

Chapter XI. finds Lieutenant Payer, a pleasant, lively writer, again taking up the narrative. In it he describes the great sledge journey to the north, which we have already referred to, and, again, in memory, he explores King William's Land, as the East Coast of Greenland, explored by the expedition, is cumulatively named. It is needless to say that the German Kaiser is so honoured by his loyal subjects; nor will we deny his right to this compliment. Still it is against all the canons of geography to name two parts of the world, especially two so near each other, by the same name. We have had already a King William Land—to which a melancholy interest attaches, as the region where Franklin's ships were lost—to the west of Baffin's Bay, and now to have another a few hundred miles further to the east, is, to say the least, rather confusing, and might, even at the expense of a little loyalty, been avoided. Would not the "Kaiser," instead of the "König" "Wilhelm's Land" have done equally well from both a loyal and nomenclatural point of view, beside being politically more correct?

In Chapter XII. is detailed another sledge journey made between the 8th and 29th of May up Ardencaple Inlet, in which Payer is again the leader and the writer. A chapter of much interest to sportsmen is the XIII.—"Hunting and Animal Life in Greenland," by Payer and Copeland: the bear, the reindeer, the hare, &c., are described from a sportsman's point of view; while Dr. Hartlaub adds a very learned and valuable article, detailing everything we as yet know of the history and distribution of the musk ox, or rather musk *sheep*, as it in reality is. Drs. Copeland and Börgen give in Chapter XIV. an account of the various sledge journeys made in the spring of 1870; and, in the one which follows, Captain Koldewey narrates his attempt to proceed to the north, a voyage which commenced on the 22nd and ended on the 30th July, in lat. 75° 29′ N. In Chapters XVII. and XVIII. Koldewey, Pansch, and Payer narrate the coast voyage of the 'Germania' to the south, and the exploration of the Kaiser Franz-Joseph's Fjords. The last great inlet, or rather series of interlacing inlets, cuts Greenland in lat. 73° 12′, and has been explored for about eight degrees of longitude (to 30° W.). The land on either side is of great altitude, Petermann's Spitze being 3480, and Payer's Spitze 2200 in height. Glaciers—offshoots of the great interior ice of Greenland—pour down the mountain valleys, while lesser (?) inlets pass off on either side. It is, however, a mistake to suppose, as was at one time done, that this inlet stretches across Greenland to the West Coast; if it does so, at all events its western termination is not within the known limits of Greenland, for though some of the fjords of West Greenland have not been thoroughly explored, the easterly termination of all of them are well known.* Professor Buchenau contributes a popular sketch of the more common Greenland flowers, to illustrate which there is an exquisitely coloured plate of a bouquet of Greenland plants. Lastly, Captain Koldewey brings his good ship home to Bremerhaven, where we leave him, with all the good wishes that a brave man and a good sailor deserves, and only this compliment—and it is no compliment but only the plain truth—that he can tell his story, in simple sailor fashion, as agreeably as he can explore gallantly. He may have had companions more learned than he: on board the 'Germania,' there was no one more intelligent than her commander.

Though in a future number we may have something to say of the concluding part of the scientific section of this work when issued, still as the narrative and some popular portion of the book is now finished, we may add, in concluding this brief review, that the narrative of the second German Polar Expedition is no ordinary work: it is marked by all the thoroughness and exhaustiveness of everything which emanates from Germany—possibly also a little by the heaviness of things Teutonic. Still that in a book of this sort is not a fault. The work is not a "popular" one in the ordinary acceptance of the term: it is a thoroughly scientific narrative—in no portion is anything left to be desired for. Scarcely a topic is touched upon which is not exhausted, and no feature of such an expedition is left unnoticed. The staff of able scientific men ensure the accuracy of the statements in regard to the matter which come under their cognizance, and the book in this respect affords a pleasant contrast to the painful trash which some so-called explorers with *no*, or what is worse, with a *little* inaccurate scientific knowledge inflict upon a long-suffering world. This work of many authors—but yet with a single individuality—will live as a monument of patient labour by brave men, long after the "Slidings after Sledges" and "Scrambles in Scribble land" have disappeared in instalments round tobacco and butter.

The narrative is illustrated by many admirable wood engravings and several plates printed in colours. Some of these are of a very high character, artistically and descriptive, and though there is nothing sensational in any of them, yet some, even to those who know and care nothing about Arctic explorations, will be looked on with keen interest. Six maps accompany the part under review, viz., a general map of Greenland showing the explorations and routes of the Expedition, by Herr Reinert; a special map of the Tyrolese Fjords, by Payer; East Greenland between 73° 30′ and 76° N. lat., by Payer; a chart of Pendulum Island by the same accomplished explorer; a small map of the Kaiser Franz-Joseph's Fjord; and a little sketch of the northern part of East Greenland, to show the route of the sledge expedition undertaken between the 24th March and 27th April, 1870. All of these maps and charts are executed with Brochau's well-known skill, and with the exception of the last two are on a very large scale. ROBERT BROWN.

* The reviewer has discussed this in his memoir, "Das Inner der Grönland."—Petermann's *Geog. Mittheilungen*, Oct. 1871.

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Bibliography.

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RUSSIA.

KONDARAKI (W. K.) Description of the Crimea. Part I. Nikolayef. 8vo., pp. 258. St. Petersburg, 1873. (In Russian.)

SOROKIN (N.) Travels amongst the Voguls. Report made to the Natural History Society of Kazan. 4to., pp. 60 and 8 plates. Kazan, 1873. (In Russian.)

MARKOVSKY (E.) Travellers' Guide for the Crimea. 12mo., pp. 165. Map. St. Petersburg, 1874. (In Russian.)

POLAND, Statistical description of. Published by the Intendance. St. Petersburg, 1873. (In Russian.)

SAVADSKY-KRASNOPOLSKY (A. K.) The Crimea: Nature, population and peculiarities of the country. 8vo., pp. 48. St. Petersburg, 1873. (In Russian.)

GUTHRIE (Mrs.) Through Russia, from St. Petersburg to Astrakan and the Crimea. 2 vols. 8vo., pp. 600. London, 1874. 21s.

SOLLOHUB (Count A. W.) Statistics of Russian Railways up to 1st January, 1874. 3rd edition, 4to., pp. 121. Map. St. Petersburg. (In Russian and French.)

VLADIKIN (M.) Travellers' Handbook for the Caucasus. 8vo., pp. 518. Map. Moscow, 1874.

ASIA.

MACGAHAN (J. A.) Campaigning on the Oxus, and the fall of Khiva. Map and illustrations. 8vo., pp. 446. London, 1874. 18s.

REGERINGS-Almanak voor Nederlandsch Indie, 1874. 8vo., pp. 1066. Batavia, 1874. 6s. 8d.

GRONEMAN (J.) Bladen uit het dagboek van een indisch geneesheer. Met een voorreede van Dr. P. J. Veth. 8vo., pp. 352. Groningen, 1874. 6s. 3d.

GARNIER (Abbé L. F.) Mon pèlerinage aux lieux saints. 3 vols., 12mo., pp. 1494. Langres, 1874. 7s. 6d.

AFRICA.

BASTIAN (A.) Die deutsche Expedition an der Loango Küste, nebst älteren Nachrichten über die zu erforschenden Länder. Vol. I. Map, 8vo., pp. 394. Jena, 1874. 10s.

READE (Winwood.) The story of the Ashantee Campaign. 8vo., pp. 440. London, 1874. 10s. 6d.

BRACKENBURY (H.) The Ashanti War: a narrative prepared from the official documents. Maps and plans. 2 vols., pp. 786. London, 1874. 25s.

RENARD (L.) Notice sur les mines de fer et de cuivre argentifère des Beni Aquil (cercle de Tenes, Alger). 8vo., 4 plates, pp. 76. Paris, 1874.

FROMENTIN (E.) Unspété dans le Sahara. 8vo., pp. 404. Paris, 1874. 6s. 3d.

FROMENTIN (E.) Une année dans le Sahel. 8vo., pp. 415. Paris, 1874. 6s. 3d.

NORTH AMERICA.

GREATOREX (Elvia). Summer Etchings in Colorado. 27 illustrations. 4to. New York, 1874. 30s.

FLAGG (W.) The Woods and Bye-ways of New England. Photo-lithographs. 8vo., pp. 460. Boston, 1873. 21s.

MELINE (James F.) Two Thousand Miles on Horseback; a Summer Tour to the Plains, the Rocky Mountains and New Mexico. 12mo. New York. 7s. 6d.

THE ENGLISHMAN'S Illustrated Guide Book to the United States and Canada. Especially adapted to the use of British Tourists and Settlers, &c. 16mo., pp. 262. London, 1874. 7s. 6d.

MARMIER (X.) Les Etats-Unis et le Canada. 8vo., pp. 247. Tours, 1874.

NEW YORK. Illustrated. 8vo., pp. 56. Map. New York, 1874. 1s. 8d.

NORDHOFF (Ch.) Northern California and the Sandwich Islands for Health, Pleasure, and Residence. Illustrated. 8vo., pp. 256. London, 1874. 12s.

ASTRONOMICAL and Meteorological Observations made during 1871, at the United States Naval Observatory. 4to., pp. 941. Washington, 1874. £2 10s.

BULLETIN of the United States Geological and Geographical Survey of the Territories. 8vo., pp. 28. Washington, 1874. 1s. 6d.

REPORT of the Commissioners of Education for 1872. 8vo., pp. 1106. Washington, 1873. 30s.

FABIAN (B.) Statistics concerning the Territory of Utah for the year 1872-3. 8vo., pp. 16. Utah, 1874. 1s. 6d.

GARDNER (Mrs. H. C.) Glimpses of our Lake Region in 1863, and other papers. 12mo., pp. 420. New York, 1874. 7s. 6d.

HAYDEN (Dr. F. V.) First, Second, and Third Annual Reports of the United States Geological Survey of the Territories for 1867, 1868, and 1869. 8vo., pp. 262. Wash., 1873.

PUMPELLY (R.) Geological Survey of Missouri; preliminary Report on the Iron Ores and Coal-fields, from the Field Work of 1872. Illustrated. 8vo., pp. 458. New York, 1873.

BROADHEAD (G. C.), MEEK (F. B.), and SHUMARD (B. T.) Reports on the Geological Survey of the State of Missouri, 1855-71. Maps. 8vo., pp. 328. Jefferson City, 1873.

HOWARD (G. W.) The Monumental City; its Past History and Present Resources. Illustrated. 8vo., pp. 314. Baltimore, 1874. 15s.

CAMPBELL (D.) Nova Scotia, in its Historical, Mercantile, and Industrial Relations. 8vo., pp. 548. Montreal, 1873.

THE YEAR BOOK and Almanac of Canada for 1874, being a Statistical Abstract of the Dominion and a Register of Legislation and of Public Men. 8vo., pp. 224. Ottawa, 1874. 2s. 6d.

SELWYN (R. C.) Geological Survey of Canada; Report of Progress, 1872-3. Montreal, 1873.

KRUMMACHER (Rev. H.) Deutsches Leben in Nordamerica. Reiseeindrücke. 8vo., pp. 164. Neusalz, 1874. 2s.

SOUTH AMERICA.

MOURIÉ (J. F. H.) La Guyane Française ou notices géographique et historique sur la partie de la Guyane habité par les colons, au point de vue de l'aptitude de la race blanche à éxploiter les terres de cette colonie. Map. 12mo., pp. 360. Paris, 1874.

AUSTRALASIA.

TROLLOPE (Anthony.) Victoria and Tasmania; being a portion of a work entitled *Australia and New Zealand*. 12mo., pp. 196. London, 1874. 3s.

TROLLOPE (Anthony.) New South Wales and Queensland. 12mo., pp. 206. London, 1874. 3s.

THE Australian Handbook and Almanac, and Shippers' and Importers' Directory, 1874. Maps. 8vo. Melbourne, 1874. 10s.

DIRECTORY for Shires, Districts, Boroughs, Cities and Towns in Victoria, for 1874. 8vo. Melbourne, 1874. 6s.

SMYTH (R. Brough.) Geological Survey of Victoria (Mineral Resources of Ballarat, by R. A. F. Murray; Coal Fields of Loutit Bay, &c.). 8vo., pp. 140. Melbourne, 1874.

STATISTICS of New Zealand, for 1872, with Agricultural Statistics of the Colony in February, 1873. And statistical summary, 1853-72. Folio. Auckland, N.Z. 1874.

POLAR REGIONS.

HEUGLIN (M. Th. v.) Reisen n. d. Nordpolarmeer in 1870-1. Vol. 3. 8vo., pp. 360. Brunswick, 1874. 8s. 9d. (Work complete, 25s. 3d.)

DIE zweite deutsche Nordpolfahrt in 1869 u. 1870, unter Kapitän K. Koldewey. Vol. i., plates, maps. 8vo., pp. 734. Leipzig, 1874. 15s. (Vol. ii., 18s.).

OCEANS.

GRAVIER (G.) Il pilota dele'Oceano Atlantico-setten-trionale. 4to., pp., 324. Genoa, 1874. 10s.

GRAVIER (G.) Il pilota nei maro della China. 4to. pp. 636. Genoa, 1874.

LABROSSE (F.) Indicateur des routes maritimes de l'ocean Pacifique, des mers de Chine et de l'Australia, etc. 8vo., pp. 458. Vannes, 1874. 8s.

ASIA.

STUMM (Lieut. H.) Russia's Advance Eastward, to which is appended a minute account of the Russian Army, by C. E. H. Vincent. 8vo., pp. 182. London, 1874. 6s.

GRIMM. Reiseeindrücke eines russischen Militär-Arztes während der Expedition nach Chiwa. 8vo., pp. 48. St. Peterburg, 1874.

FEDCHENKO (A.) Travels in Turkestan. Vol. 2, part 3 (Fishes). 4to., pp. 68, 8 plates. St. Petersburg, 1874. (In Russian.)

TAGEBUCHBLATTER eines Orientreisenden. 8vo., pp. 116. Detmold, 1874. 1s.

SACHOT (O.) Pays d'extrême Orient. Siam, Indo-Chine, Chine, Corée. Voyages, histoire, géographie, moeurs, resources natarelles. 8vo., pp. . Paris, 1874.

SOUTH AMERICA.

JAHN (A.) Wichtige Beiträge zur Einwanderung und Kolonisation in Brasilien. 8vo., pp. 168. Berlin, 1874. 2s.

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Cartography.

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Indian Maps.

IT is satisfactory, above all things, to be able to report that the publication of the Indian Atlas* is progressing at an ever increasing speed, no less than eight new sheets having been issued since our last notice, besides which a carefully revised edition of one sheet has been published. The principle observed in the preparation of the Indian Atlas appears to be that no portion of unsurveyed country shall be delineated, and this accounts for the blanks which appear on some of the maps now before us. On sheet 2 S.W. (Karrachi and environs) only the British territory is shown; on sheets 9 S.E. (part of Khyrpur, in Sindh) and 33 S.E. the unsurveyed portions of Rajputana are omitted; on sheet 53 S.E. (Hoshungabad) the adjoining portion of Bhopal remains a blank; on sheet 87 N.E. (part of Audh) the neighbouring parts of Nepal; and on sheet 124 N.W. (Assam) those of Bhutan are not delineated. These blank spaces may probably cause some annoyance to persons using the Atlas, though they, too, will admit that it is preferable to publish the sheets in this unfinished state to postponing their publication until the whole of the country falling within their margin shall have been surveyed. In addition to the sheets already mentioned there remain to be noticed sheet 3 N.E. (a portion of the Delta of the Indus), and sheet 125 N.W., with a portion of the Khasia Hills, of Sylhet and Cachar. The latter is one of the most favourable specimens of the Atlas, the hills being very fully delineated from surveys made by Lieut. H. L. Thuillier, Mr. N. T. Davey, Captain H. H. Godwin-Austen and others. Sheet 68, originally published in 1848, has been thoroughly revised, and partly re-engraved. It represents a portion of Audh.

Sheet 11 of the smaller map of the Khasia and Garrow Hills† has been published, and a second edition of sheet 16-17 of the one-inch map issued. The former is based upon surveys made in the years 1866 to 1869 by Captain H. H. Godwin-Austen, Lieut. R. V. Riddell and others. It is crowded with hills, and the almost entire absence of villages is truly remarkable.

Of Topographical and Revenue maps on a scale of one-inch to the mile, no less than twenty-five large sheets have been added to those already in existence, and for nearly one-half of these we are indebted to the officers of the Great Trigonometrical Survey of India, who are charged with the survey of native states.

The map of the district of Lohardugga in the subdivision Palamow of the Lower Provinces‡ will be completed in fifteen sheets, of which only three (7, 8, and 10) have been published. The sheet now under notice is drawn from surveys made by Major G. H. Thompson, Capt. J. Sconce and others, in 1864-68, and 1871-2,‖ and the hills are very neatly laid down upon it. The revenue survey of the Kooch Behar state will be completed in seven sheets, of which five (1, 2, 3, 4 and 7) have already been issued. Sheet 7, just to hand, is from surveys by Mr. J. H. O'Donel and others. Passing over from the Lower to the North-Western Provinces we meet with the first three sheets of a Revenue Survey map of the District of Bijnour in the Province of Rohilkand.* The map, as far as published, is based upon surveys carried on between the years 1863 and 1870 under the superintendence of Major A. D. Vanrenen; it is very neatly photo-zincographed and elaborately coloured, and many altitudes, partly based upon spirit levelling, are indicated. The Rajpootana Topographical Survey† has supplied us with one more sheet from surveys made in 1871-72, by Captain G. Strahan and Mr. H. Horst, and out of a total of 253 sheets as many as forty-four have now been published. The progress of the Topographical Survey of the North-Eastern Division of the Central Provinces‡ has been more rapid, for no less than five sheets have been issued since our last notice. Four of these sheets (viz., 7, 8, 10, and 14), are based upon surveys made in 1870-72, by Major G. C. Dupree and assistants, the fifth (15) exhibits the results of Lieut. M. T. Sale's labours (1871-72). Crossing over into the Presidency of Bombay, we meet with three new sheets of the Sindh Revenue Survey of Oomerkot and Khyrpoor,‖ for which we are indebted to Captain D. Macdonald and Mr. W. Lane, whose labours, however, date back partly as far as 1860, a delay in the publication by no means usual in the case of Indian surveys. Out of a total of 102 sheets, there have been published up to the present time no less than seventy. Far more important are the contributions of the officers of the Great Trigonometrical Survey, who have undertaken to supply us with correct maps of the Guicowar's territories. The survey is being carried on by two distinct surveying parties, the one for Kattywar, being in charge of Captains H. Trotter, R.E. and A. Pullan, the others for Guzerat, in that of Colonel D. Nasmyth and Major C. T. Haig, and the whole being conducted under the superintendence of Colonel J. T. Walker. The surveys are being published on a scale of one inch to a mile. The map of Guzerat will be completed in eighty-two sheets of large size, of which three have been published.§ They are the result of surveys carried on in the years 1870-71, and amongst the gentlemen employed on that service there were Mr. J. Hickie, Mr. Christie, Mr. Goslin, Mr. Connor, Captain Pullan, Mr. C. McA'Fee and others. The map of Kattywar¶ is much further advanced, for out of a total of sixty-one sheets as many as eighteen have already been issued to the public. The sheets now under notice embody the results of surveys made in 1870-73, the principal officers employed being Captain H. Trotter, Messrs. E. N. Wyatt, J. McGill, F. W. Ryall, N. C. Gwynne, T. H. Rendell, and W. A. Fielding. These topographical maps of the "Great Trigonometrical Survey" need not fear comparison with similar maps issued by other Indian Survey Departments. They distinguish between metalled roads, country roads, and foot-paths, show cultivated and waste lands, give the number of houses in each village, and numerous altitudes. They are neatly drawn and photo-zincographed at Dehra Dun. In spelling the names

* Indian Atlas. Sheets 2 S.W., 3 N.E., 9 S.E., 33 S.E., 53 S.E., 87 N.E., 124 N.W., 125 N.E., and a new edition of 68. Calcutta, 1873.

† Khasia and Garrow Hills Topographical Survey. Scale 1 m. = 1 inch. Sheets 16 and 17 on one sheet. 2nd edition. Calcutta, 1873. Khasia and Garrow Hills Topographical Survey. Scale 2 m. = 1 inch. Sheet 11. Calcutta, 1873.

‡ Palamow Revenue Survey. Sub-division Palamow, District Lohardugga. Sheet 10. Calcutta, 1874.

‖ Lower Provinces Revenue Survey. Kooch Behar State. Scale 1 m. = 1 inch. Sheet 7. Calcutta, 1874.

Index to the sheets of Kooch Behar State. Scale 4 m. = 1 inch. Calcutta, 1872.

* North-West Province Revenue Survey. District Binjour. Scale 1 m. = 1 inch. Sheets 1, 3, and 6. Calcutta, 1873. To be completed in 7 sheets.

Index to sheets of District Bijnour. Calcutta, 1873.

† Rajpootana Topographical Survey. Scale, 1 m. = 1 inch. Sheet 41. Calcutta, 1874.

‡ North-East Division Central Provinces Topographical Survey. Scale, 1 m. = 1 inch. Sheets 7, 8, 10, 14, and 15. Calcutta, 1873.

‖ Sindh Revenue Survey. Oomerkot and Khyrpoor State. Sheets 44, 75, and 77. Scale, 1 m. = 1 inch. Calcutta, 1874.

§ Great Trigonometrical Survey of India. Guzerat Topographical Survey. Scale, 1 m. = 1 inch. Sheets 11 and 13, and 2nd. edition of sheet 12. Dehra Dun, 1873 and 1874.

Index Chart of the Guzerat Topographical Survey, 1 inch = 24 m. Dehra Dun, 1873.

¶ Great Trigonometrical Survey of India. Kattywar Topographical Survey. Scale, 1 m. = 1 inch. Sheets 10, 11, 20, 21, 22, 23, 24, 29, and 30.

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the Hunterian system of spelling has been adopted, as far as we know, for the first time on any official Indian map, although the order for introducing that system dates some time back. We trust that the laudable example given in this respect by Colonel Walker, may soon find imitators in other government departments, for although there may be shortcomings in the system recommended by Dr. Hunter, and some small inconvenience in applying it to well-known places (the names of which might however be written according to the old style, and placed in brackets), there is no doubt of its superiority to the arbitrary modes of spelling now in use.

The officers of the Revenue Survey, in addition to supplying us with a number of one-inch maps, have likewise produced plans of two cantonments and civil stations. That of Tezpoor,* in Assam, was surveyed by Captain J. H. W. Osborne, in 1871-72; that of Dibroogurh,† by Lieutenant W. Barrow, in 1867-68.

But far more interest will probably be attached to the Trans-frontier maps,‡ compiled under the orders of Colonel J. T. Walker and Major T. G. Montgomerie, from route surveys and astronomical observations made by British and Asiatic explorers from the side of India, than to these plans or even to the Topographical and Revenue maps. The former, drawn on a scale of 16 miles to the inch, show roads, the British boundary, and all points determined trigonometrically, but no hills. The insertion of these would certainly have obscured many of the features of the maps, and numerous altitudes compensate, at least in part, for this omission. Sheet 8 comprises the country between latitudes 30° and 35° N., and longitudes 77° and 86° E. It embraces thus Kashmir and a large portion of Tibet. The other map, sheet 4, extends over one of the most interesting portions of Asia, for it embraces portions of Persia and Afghanistan, inclusive of the whole of Badakhshan (the eastern extremity of Wakhan alone excepted). Major Montgomerie has embodied in this map a great deal of fresh matter, as must freely be acknowledged by anyone acquainted with the geography of that part of the world; but he has, nevertheless, failed to utilise the whole of the existing information which is available even to persons to whom access to the Indian archives is not vouchsafed. We should, for instance, have liked to see the passes leading to Banian more correctly laid down, which might easily have been done had the accounts (as distinguished from the maps) of Wood, Masson, Burslem and others been consulted. Badakhshan, too, does not come up to our expectations. Faiz Baksh's account contains sufficient data for laying down the districts constituting that country, and the large manuscript map of the country between Peshawur and the Oxus, prepared by a native explorer, employed by Mr. Ommaney about 1869, contains much additional information, which has been disregarded. It shows, for instance, that Rustak, the great commercial town of Badakhshan, does not lie on the Oxus, but some distance to the north of it. We regret the omission of political boundaries, but we can understand the reasons which induced Major Montgomerie to take that course. In fine, Major Montgomerie's map may fairly claim to be the best and most complete one of that portion of Asia hitherto published, and politicians studying the Central Asian question can hardly do better than procure a copy of it.

E. G. RAVENSTEIN, F.R.G.S.

* Lower Provinces Revenue Survey. Cantonment, Civil Station, and Environs of Tezpoor. Scale 6 inches = 1 m. Calcutta, 1873.

† Dibroogurh Cantonment, Civil Station, and Environs. Scale 6 inches = 1 mile. Calcutta, 1873.

‡ Great Trigonometrical Survey of India. Trans-Frontier Maps. Skeleton Sheets 4 and 8. Scale 16 m. = 1 in. Dehra Dun, 1873.

Log Book.

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The Arctic Expedition.—On Saturday, August 1st, the President of the Royal Society, the President of the Royal Geographical Society, and Admiral Sherard Osborn had an interview with Mr. Disraeli on the subject of the Arctic Expedition in 1875; entering upon the important scientific and commercial results to be obtained, the great advantages of such enterprises to the naval service, and the practical details. The Prime Minister asked numerous questions, and promised to read the papers that were left with him, and to consider the subject carefully with a view to an early decision.

Height of Lake Tanganyika.—The Royal Geographical Society having retained the certified "Index Errors" of the instruments used by Lieutenant L. V. Cameron, R.N. (which were made at the Kew Observatory and at the Royal Geographical Society), will thus render these observations the most complete that have ever been made either on or near these African lakes.

On February 27th, 1874—7 A.M. at Ujiji, seven boiling-point thermometers * were used, which, corrected for Index error, gave the mean result as 207°.54, the corresponding barometric reading is 27.36 inches, temperature 82°.2.

On February 28th, 1874—7.30 A.M. at the same place, two of Captain George's Mercurial Barometers, filled on the spot, gave a mean of 27°.35, temperature 74°.†

With the above data, using the barometric sea-level of 29.92 inches,‡ and the coast temperature for February and the same latitude of Ujiji, as given by Dové, the result of computation is as follows:—

February 27th, 1874, Lake Tanganyika, Ujiji, 7 B.P. thermometers, give	2595.2 feet.
February 28th, 1874—Lake Tanganyika, Ujiji, 2 Captain George's Mercurial Barometers ...	2711.2 feet.

The first part of Lieutenant Cameron's journal not having come to hand, the result of the four Aneroids is not attainable on account of their having been re-numbered at Kasé, and the former numbers omitted.

Obituary.—DR. C. T. BEKE, F.R.G.S., F.S.A., &c. The recent death of this gentleman, who was well-known for his geographical labours, deserves a record in these columns. Dr. Beke gained the gold medals of the Royal Geographical Society, and of the sister society in France for his exploration of Abyssinia from 1840 to 1843, during which period he fixed by astronomical observations the latitude of more than 70 stations, roughly mapped about 70,000 square miles, and collected dialects and vocabularies of thirteen languages and dialects spoken in the country. The information acquired by him subsequently proved of signal service on the occasion of the Abyssinian Expedition. Dr. Beke was the editor of that volume of Hakluyt series which is devoted to old Gerrit de Veer's "Three Voyages by the north-east towards China and Cathay," to which such keen interest has attached itself since the discovery of Barents' hut on the north-

* All by Casella, Optician, Holborn.

† Made by Gould and Porter, 181, Strand.

‡ In all previous observations, this sea-level has been used.

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east coast of Novaya Zemlya. Dr. Beke also paid great attention to the investigation of Biblical topography, and his recent work, in which he contended that the true Mount Sinai was a volcano situated east of the Gulf of Akabah, has been already noticed by us (*Ocean Highways* for August 1873). He died in the seventy-fifth year of his age.

Indian Marine Surveys.—In order to provide for the resumption of this crying want, arrangements have been made for the organization of a small survey flotilla, which will consist of one steam tender, three brigs, two schooners, and five steam pinnaces, with competent surveyors and efficiently manned. The following vessels have been selected for this service. The gun-boat 'Clyde,' a steamer belonging to the Bombay Government of 300 tons and 60 horse-power (nominal); two old teak-built pilot brigs of 300 tons, the 'Guide' and the 'Megna'; the 'Marie' a teak-built schooner, on board of which Captain Constable did his surveys in the Persian Gulf from 1858 to 1860; and a very small schooner called the 'Augusta." Two of the steam-pinnaces will be built at Calcutta for 300*l.* each. They will be 28 feet long by 7, with engines of three horse-power, and will hoist inboard. Two others are to be built in this country.

Introduction of Tobacco into India.—There is an interesting account of the introduction of the use of tobacco into India, in the forthcoming volume of *Elliot's Muhammadan Historians* (vol. vi.). Asad, the narrator, says that he found some tobacco at Bijápur, and presented it, in a beautiful pipe, to the Emperor Akbar. His Majesty inquired what it was, and was told that it was tobacco, a medicine well known in Mecca and Medina. He began to smoke it, but his physician interposed, saying that it was an untried medicine about which the doctors have written nothing. Akbar replied—"Truly we must not reject a thing that has been adopted by the wise men of other nations merely because we cannot find it in our books; or how shall we progress?" Asad had brought a large supply of tobacco, and distributed it among the nobles of Akbar's court, and the practice of smoking was introduced. After that the merchants began to sell it, and the custom of smoking tobacco rapidly spread. Akbar himself, however, did not adopt it.

Indian Pendulum Observations.—The Indian pendulum observations, which have just been brought to a conclusion at Kew, were first instituted in 1864, by Colonel Walker, the Superintendent of the Great Trigonometrical Survey of India, with the permission of the Secretary of State. Many of the most eminent Fellows of the Royal Society also supported the scheme, on the ground that it afforded an independent check on the local variations in the direction of the force of gravity, and on the disturbances due to the mountain masses to the north of India; that it threw light on the density of the earth's crust, as well as on the figure of the earth; and that generally speaking, it was a necessary part of any extensive geodetic operations. For the purpose of the experiments, the Royal Society lent an astronomical clock and two invariable pendulums, and this equipment was supplemented by a copper vacuum cylinder and an air pump. It was decided to make Kew Observatory the base station in this country for the operations, and before the pendulums were sent to India, they were swung there by Mr. Loewy. The apparatus arrived in India in 1865, and the work was at once commenced by Captain J. P. Basevi, R.E., who had been placed in charge. In the course of the next five years Captain Basevi swung the pendulums at some nineteen stations on the Indian arc from Dehra Dun to Cape Comorin, at two stations on the East Coast, and at two on the West Coast of India, and he likewise swung them at Minicoy, an island of the Lakhadivh group. In 1870, two convertible pendulums were lent to Colonel Walker by the Imperial Academy of Sciences at St. Petersburg. These pendulums had been used on the Russian arc, and it was hoped that by their means a connection might be established between the Indian and Russian pendulum operations. An arrangement for measuring the lengths of these pendulums form part of the whole apparatus, so that they are capable of giving not only relative results, such as are obtained by the invariable pendulums, but also absolute values of the length of the simple seconds pendulum. Captain Basevi had at that time but little opportunity of using these pendulums, and in the spring of 1871 he started for the lofty plateaux of Tibet, taking with him the invariable pendulums only. On his way thither he took observations at Mian Mir, and from thence ascended to the Rukshu and Ladak. Here, at altitudes of 15,500 and 17,000 feet respectively, he continued his observations; but the severity of a climate where the thermometer rises to 70° or 80° in the afternoon, to fall below Zero at daybreak, proved unfortunately fatal to this gallant and able officer.

Captain Heaviside was subsequently appointed to complete the operations. After some preliminary observations at Dehra, and at Mussoorie, he went to Kaliana, the base station in India for the pendulum experiments. He there took observations with the invariable pendulums to determine whether they had undergone any change since they were last swung there. He also swung and measured at Kaliana the Russian convertible pendulums. He then started for England, and on his way to this country he swung the pendulums at Bombay, at Aden, and at Ismailia in Egypt. At the Kew Observatory, he has swung the invariable pendulums, to determine whether they had undergone any alteration since 1865, and he has also carried out there a complete series of experiments with the Russian convertible pendulums for the determination of the length of the simple seconds pendulum.

At the suggestion of General Sir E. Sabine, a further series of experiments is being made with the convertible pendulum employed in 1818 by Captain Kater. The bar of this pendulum, owing to some unknown cause, had become bent. The bar has been re-straightened, and the knife-edges re-ground and re-bedded. In its thus altered condition this pendulum has been swung at the Kew Observatory, by Captain Heaviside; and Lieut.-Colonel A. R. Clarke, R.E., has undertaken to measure the distance between the knife-edges of the pendulum at Southampton. From the value thus obtained, a second determination of the length of the simple seconds pendulum at Kew will be made. Captain Heaviside will shortly return to India where the final results of the whole series of experiments from 1865 will be computed out and arranged for publication.

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Chinchona Cultivation in Ceylon. — The demand for chinchona plants in Ceylon is now so great that it is found to be very difficult to meet it from the Government nurseries at Hak-galle. In his Report dated March 28th, 1874, Mr. Thwaites says that, during the year 1873, applications were made to him for 720,000 chinchona plants, and that 670,500 were issued. This will give some idea of the activity going on in the cultivation of chinchona in Ceylon. Moreover, many planters are now forming nurseries of their own for the propagation of plants from seeds and cuttings.

Publication of Mr. Burgess's Report on his Archæological Work in India.—The India Office has resolved to print the account of Mr. Burgess's recent researches in the Bombay Presidency, together with its accompanying illustrations. The report contains an exhaustive notice of his discoveries at Belgam, Konur, and Badami, at which latter place are some highly interesting sculptured caves, a complete delineation of which, with a few casts, would form a valuable illustration of Hindu art and Vaishnava mythology—only to be rivalled by what Ajanta affords of Buddhism. Mr. Burgess has brought home altogether fifty-four photographs, between twenty-five and thirty rubbings of inscriptions, about forty ground plans, sections, and drawings of columns, &c., and forty sketches of sculptures.

Correspondence.

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THE CAMERON SEARCH EXPEDITION.

THE following letter from Lieutenant Cecil Murphy, R.A., finally sets at rest the ungrateful controversy as to whether it was owing to aid given by Lieutenant Cameron's Expedition, that Dr. Livingstone's body and effects were sent down in safety to the coast :—

SIR,—Being home from India on sick leave, I have been asked by several persons "in the interest of my friend Lieutenant Cameron, R.N., of the truth, and of my own character," to write to you on the subject of the correspondence that has appeared in the *Times* respecting the Cameron Livingstone Expedition. I should have done so before now but that I had not the whole of the correspondence before me.

A short account of what actually occurred will be better, I think, than any expression of opinion from me.

The first intimation that we—Lieutenant Cameron, the late Dr. Dillon, and myself—had of the death of Dr. Livingstone was a letter written by Jacob Wainwright, without any address, which was brought to Cameron by Chuma. He, hearing that there were white men in Unyanyembe coming up to help Dr. Livingstone, very naturally supposed that his son must be one of the number. Chuma informed us that his caravan was some four marches distant; that the men were starving and naked, and unable to move from the want of anything wherewith to purchase food, and in their name he begged for assistance. Cameron sent him back, giving him a bale of cloth, good Merikani, one of the last two or three bales of that description that we had, and one of the last eight, as well as I remember, that we had of any kind. This assistance enabled the caravan to come on.

It was the wish of the men, and a very natural one, to stop and rest themselves at Unyanyembe, and besides supporting them while there, Cameron gave them a large supply of cloth and beads for their down journey, most of which was, however, spent in riotous living, the camp becoming a scene of drunkenness from morning till night, before they started. For all that Mr. Thomas Livingstone says of their having good credit with the Arabs, I have no hesitation in asserting that had it not been for the presence of our Expedition at Unyanyembe, neither Susi nor Chuma, nor any of the others, could have obtained supplies on credit, and they would therefore have been unable to continue their march to the coast, all their stores being exhausted; for to pass through the country of the Wagogo without paying tribute is an impossibility. It is not likely that Sayed bin Salim al Lamki, the Wali or Civil Governor of Unyanyembe (under Sayed Bargash of Zanzibar nominally), the man whom Dr. Livingstone described as the head of the slave ring or *coterie* there, the man who had always prevented his letters reaching the coast because he supposed them injurious to the great slaving interest, and without whose consent no sales or purchases are or can be made there, would have allowed or assisted the caravan to pass quietly to the coast, carrying papers that he believed would do great injury to himself and the slave trade. Can any one believe that a man described by Livingstone as being so crafty could have been such a fool, when he could have stopped them by simply withholding the supply of stores on credit? It is therefore a fact not admitting of argument, spite of Mr. Thomas Livingstone's inuendoes, that to the presence of Cameron's Expedition at Unyanyembe at the time is due the fact of his father's remains and papers having been safely brought through that place, and equally so that my own presence subsequently enabled them to travel unmolested through the country between there and the coast. Not that I personally, constantly ill with fever as I was, could have done very much to protect them, but the mere fact of a white man's presence helped to insure their safety. I do not claim any credit for this, nor does it detract from the merit of the negroes.

As I have said, nearly all the stores given to Susi by Cameron were spent at Unyanyembe in drink. Within 40 miles of that place Susi informed me that he had not enough for more than a week's march further. He was openly and loudly accused by the other negroes, who were in open mutiny against him, which I with difficulty quelled, of having misapplied the stores given for all to his own benefit. I had to send back to Unyanyembe to bring more stores on credit for both them and myself (some of my own having been stolen). Without this they could not have proceeded, and without me they would not have got it. In point of fact Susi did try, and failed. With regard to the *ruse* practised of concealing the body of Dr. Livingstone as a package of cloth, I believe firmly that in no other way could the portion of country occupied by the Wagogo, and from there to the Kingani, have been traversed, so great is the superstition of the people about corpses and witchcraft. The credit of this proceeding is due to Issa, the interpreter, well-known on the Zanzibar station in the navy, one of Cameron's men, who was returning with me, as he and "Bombay" could not be got to agree.

It had been intended that Chuma and some others should start for Ujiji. This shows that they at any rate attached some importance to what had been left there by Dr. Livingstone. Their chief object, however, as detailed by them at the time to me, was to secure two bales of cloth left there, which was all they depended on for getting down to the coast. Cameron gave them cloth in exchange for this as he was going to Ujiji, and they abandoned the idea. If they had attempted the journey of course it is impossible for me to say what would have happened. But I do not believe, judging from the state of the surrounding country, that they would ever have reached Ujiji. The Arabs themselves were unable to break through Mirambo's forces, and except at one point—to the south—they were hemmed in by him

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on every side. We found out this to be the true state of matters when we were in Unyanyembe. The rumours that we heard when even only four days' march off were absurdly contradictory, and it was one of these I suppose reaching the Consul at Zanzibar which he repeated, to the effect that the country was perfectly clear. Those who were with the advanced brigade in Abyssinia will remember the similar contradictory rumours about King "Todorus" and his doings, and how much reliance is to be placed on native report. With both Mirambo and the Arabs against them, I believe it would have been simply impossible for them or any one else, without the moral force given by the unwonted presence of a white man (which has enabled Cameron to do it) to get to Ujiji from Unyanyembe. Whether the map and the journal secured by Cameron are of any value or not—a question which cannot be answered till they arrive home—I think it would have been in better taste for Mr. Thomas Livingstone not to have been the first to undervalue the efforts of a stranger, made at the imminent risk of his own life, to secure what may be an extremely valuable relic of his father.

It is stated on the authority of Susi and Chuma that the caravan would have reached the coast much more easily and quickly if they had not been hindered by having to escort Dr. Dillon and myself. I have already stated that I believe without my presence—poor Dillon having died a few days after we started, to my inexpressible grief—they would never have reached the coast at all. It only remains for me to add what was the actual delay caused by our presence. On three days poor Dillon was too ill to travel, and I had to delay the caravan another day to bury him. I also on two occasions was unable to travel so far as Susi wished from fever. If against this is placed the amount of assistance I gave—as any European in my place would have done—in insisting in going on when they (for negroes are not quite faultless) wanted to stop behind where pombé was plentiful, and the votaries of the sable Venus were kind, and in quelling discontent and keeping the men together when they would have deserted each other, but were sure that a white man would not see them wronged, I think I may fairly claim the balance to be in my favour.

There is one more subject on which I must touch. Mr. Stanley writes to me—"There is a rumour you have resigned. If so, there must have been some great reason. Why not write a book and convert people to your own view?" Others write of me that I "left my work unfinished at Unyanyembe;" "One has resigned," and so on. As the cause of my original resignation was a private matter, and as my action in so doing has been declared by the Council of the Royal Geographical Society to be perfectly satisfactory, I did not intend ever to bring this matter before the public. A number of rumours having got about concerning me, however, I think that I am bound, in justice to myself, and the regiment to which I have the honour to belong, to state what really occurred.

On the arrival of Dr. Livingstone's body at Unyanyembe, I, considering that the great end and aim of our expedition—to render him some service—was no longer possible to accomplish; finding myself almost useless to Cameron for further exploration from my state of health; thinking that one European at least should accompany the late traveller's remains and papers to the coast; knowing that my absence would make the somewhat limited stores with the expedition last much longer (for, though I was to pay all my own expenses, a cheque on my agent was of little use in Central Africa), and, for another reason, into which it is not necessary to enter, I thought it my duty to resign, however bitter it might be after going so far, and I did so. A few days afterwards, Dr. Dillon became so ill that he determined to return to the coast, as the only chance for his life, instead of proceeding. I at once asked that my resignation should be cancelled, not thinking that Cameron should be left alone in such a country, and waived my former reasons for returning before this greater one for going on.

Though I strongly pressed it, however, Cameron would not have it so, saying, he found he had, after supplying Dillon, about enough stores for himself, but not for two. Thus, although I did, at one period, resign the expedition, for reasons considered "perfectly satisfactory" by the Royal Geographical Society, I did eventually leave it very much against my will, and it cannot be said that I "left my work unfinished at Unyanyembe."

In conclusion, let me hope that this statement will induce Englishmen to support their gallant young countryman, now working in that far distant land. All he wants to ensure success is a sufficiency of funds. Stanley is going out amply provided for. Let not the public withhold from our countryman that assistance which alone can avail him, while an American, for whom, at the same time, I have the warmest feelings and good wishes, is from a private source amply provided with them. No better sentiment could be written on this subject than Mr. Clements Markham's observation, that "Englishmen applaud; let them now insure success."

[With reference to Mr. Thomas Livingstone's insinuation, in the *Times* of August 10th, that Dr. Livingstone left plenty of cloth at Unyanyembe which would have enabled his followers to reach the coast without further aid, the truth is as follows:—Dr. Livingstone left four bales of cloth at Unyanyembe; Lieutenant Cameron recovered them with great difficulty from the man in whose care they were left, and gave them to Susi; they were expended by Susi in drink: and the Cameron Expedition furnished the supplies for conveying Dr. Livingstone's body and effects, with his servants, to Zanzibar.]

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To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—With regard to Mr. Michell's letter at p. 214 of your August number, I beg to say that in the letter therein referred to I had, by a slip, written Veniukof instead of Semenof. Mr. Michell is mistaken, it appears to me, in supposing that he *distinctly* named D'Ohsson as his authority for the identity of Karakorum and Bela-sagun; in fact, I supposed from the way the reference to D'Ohsson was introduced that the latter was distinctly *excluded* from responsibility for that identity, but quoted for the identity of *ordu balik* only, and I had not the book to refer to.

I do not make out clearly to what Mr. Michell alludes when saying in the note below that I seemed in one passage to assent to the identity of Belasagun and Karakorum. I should like to make this clear.

Balghasun is a Mongol word apparently meaning city;* (perhaps "walled city," but I have no access to a dictionary). In that sense Kara Balghasun seems to be applied to Karakorum, "the Black Town."

Belasagun again (never mind its etymology) is applied as a *proper name* to a certain specific city of Central Asia by certain Muhammadan writers.

It is very likely that this proper name was, as has been suggested, merely a misunderstanding and corruption of the common noun Balghasun, "city," parallel to the well-known etymology of Stambúl.

But it is quite a different thing to say that Karakorum was the same as Belasagun; to that I have given no colour of assent.—Yours faithfully,

H. YULE.

PALERMO, *August 8th*, 1874.

* It is, I presume, a derivative from *Baligh*. *Asun* is, one sees, a common Mongol termination, but I do not know its force. For instances of the use of Balghasun for "town," see notes to *Marco Polo* I. 261, 269, and II. 7.

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Proceedings of Geographical Societies.

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BRITISH ASSOCIATION.

SECTION E.

Thursday, August 20th.

THE Geographical Section (E) met in the Presbyterian College, Belfast, on the above date, when the President, Major Wilson, R.E., took the Chair. The Vice-Presidents were Sir Bartle Frere, G.C.S.I., K.C.B., F.R.G.S.; Admiral Ommanney, C.B., F.R.S., F.R.G.S., and Major-General Strachey, F.R.S., F.R.G.S.; and the Secretaries, E. G. Ravenstein, F.R.G.S., F.S.S.; E. C. Rye; and J. H. Thomas, F.R.G.S.

THE PRESIDENT'S ADDRESS.

THE PRESIDENT, in his opening address said he believed it was usual in the addresses to this section to select some special subject; he therefore begged to call attention to the influence which the physical features of the earth's crust have on the course of military operations; to the consequent importance of the study of physical geography to all those who have to plan or take part in a campaign; and to the contributions to geographical science that are due, directly or indirectly, to war, and the necessity of preparing for war. To show how varied are the conditions under which war has to be carried on, and how much its successful issue may depend on a previous careful study of the physical character of the country in which it is waged, it is only necessary to remind you of the recent operations on the Gold Coast, brought to a successful issue in an unhealthy climate, and in the heart of a dense tropical forest, where an impenetrable undergrowth, pestilential swamps, and deep rivers obstructed the march of the troops; of the Abyssynian expedition, landing on the heated shores of the Red Sea, and thence, after climbing to the lofty frozen highlands of Abyssinia, working its way over stupendous ravines to the all but inaccessible rock, crowned by the fortress of Magdala; of the march of the Russian columns across the steppes and deserts of Central Asia to the Khivan oasis, one month wearily plodding through deep snow, the next sinking down in the burning sand, and saved from the most terrible of disasters by the timely discovery of a well; and, lastly, of the great struggle nearer home, the last echoes of which have hardly yet passed away, when the wave of German conquest, rolling over the Vosges and the Moselle, swept over the fairest provinces of France. The influence of the earth's crust on war may be regarded as twofold: first, that which it exerts on the general conduct of a campaign; and, second, that which it exerts on the disposition and movement of troops on the field of battle. Military geography treats of the one, military topography of the other; and it is well to keep this broad distinction in view, for as with strategy and tactics, they stand in such close relation to each other that it is not always easy to say where geography ends and topography begins. Of special importance in the first case are great inequalities or obstacles that confine or obstruct the movement of large bodies of troops, and those features that retard or accelerate their march. The climate of the theatre of war must always have an important influence on military operations, and should be the subject of careful study. Our own experience in the Crimea shows how much suffering may be caused by want of forethought in this respect. General Verevkin's remarkable march of more than 1000 miles, from Orenburg to Khiva, with the thermometer ranging from 24° below zero to 100°, without the loss of a man, shows what may be accomplished with due preparation. Nor should the geological structure of a country be overlooked in its influence on the varied forms which the earth's crust assumes, on the presence or otherwise of water, on the supply of metal for repairing roads, and, if we may trust somewhat similar appearances on the Gold Coast, at Hong Kong, and in the Seychelles, on the healthiness or unhealthiness of the climate. It is scarcely necessary to remind you that though mountain ranges and rivers materially affect the operations of war, they are by no means insurmountable obstacles. The Alps have been repeatedly crossed since the days of Hannibal; Wellington crossed the Pyrenees in spite of the opposition of Soult; Diebitsch the Balkan, though defended by the Turks; and Pollock forced his way through the dreaded Khyber; whilst there is hardly a river in the length and breadth of Europe that has not been crossed, even when the passage has been ably disputed. This is hardly the place to discuss the minuter details of military geography and topography: they will be found in the works specially devoted to the subject.

Queen Elizabeth's Minister was right when he said that "knowledge is power"; and a knowledge of the physical features of a country, combined with a just appreciation of their influence on military operations is a very great power in war. A commander entering upon a campaign without such knowledge may be likened to a man groping in darkness; with it he may act with a boldness and decision that will often ensure success. It was this class of knowledge, possessed in the highest degree by all great commanders, that enabled Jomini to foretell the collision of the French and Prussian armies at Jena in 1807, and in later years enabled a Prussian officer, when told that MacMahon had marched northwards from Chalons, to point unerringly to Sedan as the place where the decisive battle would be fought. As, then, all military operations must be based on a knowledge of the country in which they are to be carried on, it should never be forgotton that every country contiguous to our own—and the ocean brings us into contact with almost every country in the world—may be a possible theatre of war, and that it is equally the duty and policy of a good government to obtain all possible information respecting it. Is it with much satisfaction that we can turn to the efforts made by this country to acquire that geographical knowledge which may be of so much importance in time of need? Though we had for years military establishments on the Gold Coast, and though we had, more than once, been engaged in hostilities with the Ashantis, and might reasonably have expected to be so again, no attempt appears to have been made to obtain information about the country north of the Prah, or even of the so-called protected territories. The result was that when the recent expedition was organized, the Government had to depend chiefly on the works of Bowdich, Dupuis, and Hutton, written some fifty years ago, and on a rough itinerary of the route afterwards followed by the troops, for their information relating to the country and its inhabitants. What advantage has been taken of the presence of the officers who have been in Persia during the last ten years to increase our knowledge of that country—knowledge which would be very useful at present in the unsettled state of the boundary questions of the Northern and North-Eastern frontiers? How little has been added to our knowledge of Afghanistan since the war of 1842? and what part did India take in Trans-Himalayan exploration before Messrs. Shaw and Hayward led the way to Yarkand and Kashgar? It was with feelings of no slight satisfaction that many of us heard last year that the policy of isolation and seclusion which India appears to have adopted as the last soldier of Pollock's relieving force re-crossed the Indus was at last to be broken, and that an expedition, well found in every respect, was to be sent to Kashgar. It seemed an awakening from the long slumber of the last thirty years, during which we were content to stay at home in inglorious ease, resting under the shadow of the great mountain ranges of Northern India, whilst we sent out mirzas and pundits to gather the rich store of laurels that hung almost within our grasp.

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Far be it from me to depreciate the valuable services of those gentlemen—services frequently performed at great personal risk and discomfort; but who can compare the results they obtained with those that would have been brought back by English officers, or by travellers, such as Mr. Shaw, Mr. Ney Elias, and others. It has been said that if officers travelled in countries where Government could no longer protect them, they might be killed by the natives, and that then, if the murderers were not punished, England would suffer loss of prestige. But is this the case? As a matter of fact, the number of travellers who lose their lives at the hands of the natives of the countries in which they are travelling is quite insignificant when compared with the number of those who return in safety. Let us, then, hope that the Kashgar mission may date the commencement of a new era, during which geographical enterprise may be encouraged, or at any rate not discouraged amongst the officers of the army, and that, if few will now deny that a knowledge of Ashanti, of Yemen, of the Northern and North-Eastern frontiers of Persia, of Merv, Andkin, Maimana, Badakshan and Wakhan, would have been of importance in the years just passed, it may not be forgotten that a knowledge of these countries may be of still more importance in a not far distant future. May we not take a hint in this respect from our now near neighbours in Central Asia, the Russians? No one who has followed their movements can fail to have been struck by the intense activity of their topographical staff, an activity that can only be compared to that of England at the period when Burnes, Eldred Pottinger, Wood, Abbott, Connolly, and others, whose names are ever fresh in our memories, were penetrating into the wildest recesses of Central Asia. In alluding to the contributions of war to geographical science, it is perhaps hardly necessary to mention the very obvious manner in which military operations teach us geography by directing our attention for the time being to the country in which they are being carried on, or to the direct results that have followed many campaigns from the days of Alexander to our own. The Russians are indeed far in advance of us in all that relates to those survey operations, and that geographical exploration which should always be carried on simultaneously with the advance of an expeditionary force into an unknown or but partially known country; they have long since realised the importance, almost necessity, of accurate geographical knowledge, based on sound systematic survey, and having learned in time the lesson that opportunities once lost may never be recovered, make every effort to take advantage of those that are offered to them. In the expedition against Khiva each column had attached to it an astronomer and small topographical staff, whose duty it was to fix the geographical positions of all camps, and map the route and adjacent country, whilst officers on detached duty were instructed to keep itineraries of their routes which might be fitted into the more accurate survey. On the fall of Khiva an examination of the Khanate was at once commenced; and it was even thought necessary to send Colonel Skobelof, disguised as a Turkman, to survey the route by which Colonel Markosof should have reached the asis. It is much to be regretted in the interests of geography that some such system was not adopted during the recent operations on the Gold Coast, and that so little, comparatively speaking, has been added to our knowledge of Ashanti and the protectorate. The conclusion of peace with King Coffee, and the effect that must have been produced on the inland tribes by the destruction of Kumasi, appear to offer facilities for the examination of a new and interesting region which it is to be hoped will not be neglected by those who are able and willing to take part in the arduous task of African exploration.

The most important military contributions to geography have undoubtedly been those great topographical surveys which are either completed or in progress in every country in Europe except Spain, Turkey, and Greece. Frederick the Great was, I believe, the first to recognise that in planning or conducting operations on a large scale, as well as directing many movements on the field of battle, a commander should have before him a detailed delineation of the ground of a whole or part of the theatre of war. To supply this want, Frederick originated military topography, which, in its narrower sense, may be defined as the art of representing ground on a large scale in aid of military operations. It was found, however, that during war there was rarely sufficient time to construct maps giving the requisite information, and thus the necessity arose of collecting in peace such data as would enable maps to be prepared. In this necessity may be seen the origin of all national topographical surveys, including our own, which was commenced as a purely military survey in 1784 by General Roy, and transferred in 1791 to the old Board of Ordnance. The gradual development of these surveys, and the various stages through which they have passed before reaching their present state of excellence, need not be noticed here. Side by side with the large establishments engaged in the production of the topographical maps, there have grown up in most countries extensive departments, sometimes employing from fifty to sixty officers, whose duty it is to supplement the maps of their own and foreign countries by the collection of all information of whatever nature that may be useful in time of war. The brief interval that elapses between the declaration of war and the commencement of hostilities, the rapid movements of armies and the short duration of campaigns at the present have shown more clearly than ever the imperative necessity of previous preparation for war; and the publication of the great surveys of most European countries has given an impetus heretofore unknown to the studies I have alluded to.

The progress of the European surveys, and especially of our own, has been marked by many results which have indirectly influenced the advancement of geographical science. Such are the improvements in instruments made during the progress of the triangulation, the introduction of the Drummond light, Colby's compensating bars, &c.; the connection of the English and Continental systems of triangulation; the pendulum observations at various places; the measurement of arcs of the meridian; the comparison of the standards of length of foreign countries, of India, Australia, and the Cape of Good Hope, with our standard yard, which has recently been completed at the Ordnance Survey Office, Southampton. In the same category may be placed the improvements in the art of map engraving, in the application of chromolithography to the production of maps as exemplified in the Dutch process of Col. Bessier and the Belgian maps; and the employment of electrotyping to obtain duplicates of the original plates. The method of copying maps by photography without any error in scale, or any distortion that can be detected by the most rigid examination, was first proved to be practicable, and was adopted in the Ordnance Survey Department, in 1854, by Major-General Sir Henry James, for the purpose of facilitating the publication of the Government maps of the United Kingdom on the various scales. Since that date the necessity of rapidly producing, multiplying, enlarging, and reducing maps has tended towards the development of the various photographic processes which have been brought to such a high state of perfection. During the last five years photographic negatives on glass covering an area of 10,071 square feet were produced at the Ordnance Survey Office for map-making purposes alone, and from these negatives 21,760 square feet of silver prints were prepared and used in the various stages of the Survey. An area of 959 square feet of the negatives was also used in producing 13,595 maps on various scales by the photo-zincographic process, which was also introduced by Major-General Sir Henry James. It was by similar processes that the Germans were enabled to provide the enormous number of copies of the various sheets of the map of

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France required during the war of 1870-71. Any comparison of the maps of various countries would necessarily occupy much time, so I will only add that as specimens of engraving the sheets of our one-inch map are unrivalled, and that no foreign maps can compare for accuracy of detail and beauty of execution with the sheets of our six-inch survey. Our great national survey is the most mathematically accurate in Europe, and it speaks much for the ability of the officers who have brought it to its present state of perfection, that from the very first they recognised the necessity of extreme scientific accuracy in their work, and that they have never had to withdraw from the position they have taken up with regard to the many questions of detail that have arisen from time to time.

Before concluding this portion of my address I would draw your attention to the appliances used in the minor schools of this country for teaching geography, as they would seem to need some improvement. The appliances to which I allude are models or relief maps, wall maps, atlases, and globes. The use of models as a means of conveying geographical instruction has been too much neglected in our schools. If any one considers the difficulty a pupil has in understanding the drawing of a steam engine, and the ease with which he grasps the meaning of the working model, and how from studying the model and comparing it with the drawing he gradually learns to comprehend the latter; he will see that a model of ground may be used in a similar manner to teach the reading of a map of the same area. Relief maps of large areas on a small scale have their uses, but they are unsuitable for educational purposes on account of the manner in which heights must be exaggerated to make them appear at all; this objection, however, does not apply to models of limited areas on a sufficient scale, which always give a truthful and effective representation of the ground. One reason why models have not been more used has been their cost, but the means of constructing them with ease, rapidity, and at slight expense, are quickly accumulating as the six-inch contoured sheets of the Ordnance Survey are published. Instruction in geography should begin at home, and I would suggest that as the six-inch survey progresses each decent school throughout the country should be provided with a model and map of the district in which it is situated. If this were done the pupils would soon learn to read the model, and having once succeeded in doing this, it would not be long before they were able to understand the conventional manner in which topographical features are represented on a plane surface, and acquire the power of reading not only the map of their own neighbourhood, but any map which was placed before them. In our wall maps I think we have been too much inclined to pay attention to the boundaries of countries, and to neglect the general features of the ground. It is difficult to say whether the maps have followed the teachers or the teachers the maps, but I fear instruction in physical geography too often comes after that in political geography, instead of a knowledge of the latter being based on a knowledge of the physical features of the earth. My meaning may perhaps be explained by reference to a wall-map, probably well known to every one, that of Palestine, which frequently disfigures rather than ornaments the walls of our schoolrooms. In this map there are usually deep shades of red, yellow, and green, to distinguish the districts of Judea, Samaria, and Galilee, and perhaps another colour for the Trans-Jordanic region with a number of Bible names inserted on the surface, whilst the natural features are quite subordinate, and sometimes not even indicated. There is perhaps no book that bears the impress of the country in which it was written so strongly as the Bible; but it is quite impossible for a teacher to enable his pupils to realise what that country is with the maps at present at his disposal. The first object of a wall-map should be to show the geographical features of countries, not their boundaries, and for this purpose details should be omitted, and the grander features have special attention paid to them. In school atlases the same fault may be traced, physical features being too often made subordinate to political divisions; and there is also in many cases a tendency to overcrowd the maps with a multitude of names which only serve to confuse the pupil and divert his attention from the main points. The use of globes in our schools should be encouraged as much as possible, as there are many physical phenomena which cannot well be explained without them, and they offer far better means of conveying a knowledge of the relative positions of the various countries, seas, &c., than any maps. The great expense of globes has hitherto prevented their very general use, but some experiments are at present being made with a view to lessening the cost of their construction, which it is hoped may be successful. I cannot pass from this subject without alluding to that class of maps which gives life to the large volumes of statistics which are accumulating with such rapidity. On the continent these maps are employed to an extent unknown in this country, both for purposes of reference and education, and they convey their information in a simple and effective manner.

The PRESIDENT then noticed briefly the most important geographical events of the year, and concluded his Address by enumerating the papers to be read during the meeting.

ARCTIC EXPLORATION.

Mr. E. C. RYE read a paper by Admiral Sherard Osborn, C.B., F.R.S., on the "Routes to the North Polar Region," which forms the leading article of our present number.

Lieutenant HERBERT CHERMSIDE next read a paper on "Mr. Leigh Smith's voyage to Spitzbergen."

In this communication a narrative was given of a series of three explorations made by Mr. Smith in his yacht 'Sampson,' in the years 1871, 1872, and 1873. On the last of these occasions the author accompanied Mr. Smith. The various voyages were undertaken between May and September, and were minutely traced by Lieutenant Chermside, the furthest point reached being considerably to the north of the Seven Islands. He described the difficulties experienced from ice floes and foul ground encountered inshore; he also referred to the fortunate relief which Mr. Smith was able to afford the Swedish Arctic Expedition in 1873, who had been frozen in from the previous year. A description of the physical geography of Spitzbergen terminated his paper.

Admiral OMMANNEY remarked that he believed the late Government fully intended that an expedition should be sent out, but the change of Ministry altered the aspect of affairs, and now a declaration of policy in reference to this and other points must be waited for. It was to be hoped, however, Mr. Disraeli would follow up what was believed to be the intention of Mr. Goschen on the subject.

Captain S. ANDERSON, R.E., then read a paper "On the Demarcation of the International Boundary between Canada and the United States," which we purpose publishing in our next number.

Friday, August 21st.

AFRICA.

THE first paper read was one by Mr. E. G. RAVENSTEIN, F.R.G.S., F.S.S., "On Dr. G. NACHTIGALL'S Explorations in Africa, 1869-74." Dr. Nachtigall's important explorations in Eastern Sahara and in Sudan are but little known in England, we shall therefore publish this paper *in extenso* in our next number.

Surgeon-Major S. ROWE, C.M.G., read a paper "On Sir J. Glover's Expedition from the Volta to Kumassi."

The author gave a description of the position and political relations of the tribes in the eastern division of the Gold Coast territory intended to be raised and trained by the Glover Expedition; also of the Trans-Volta tribes, and a short attack of the Ashantis on Krepi in 1869, and the capture of the German missionaries. He referred to the treaties made in 1869 by

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British authorities with the Aquamus and to the successful attack on the piratical island of Duffo in 1870; and then described the confidence of the Haussas and Yorubas in Captain Glover, and their arrival from Lagos to join him; the assembly of the Beach tribes at the mouth of the Volta at Addah Fort, and of the Aquapims, Krobbos and Krepis at Blappáh under Captain Sartorius, the crossing of the Volta (23-25 December), and the successful fights at Farah and Adidumay. He then alluded to the causes of Captain Glover's return over the Volta, and described the incidents of the march through Krobbo, Aquapim, and Akim to Ashanti, with the crossing the Prah on 15th January, and the taking of Abogu, Bangsu, Towassy, Connummo, and Odumassi, and the different attempts made to communicate with the main body under Sir Garnet Wolseley—amongst them, the passage of the Anum River by Sartorius. The presence of Sir Garnet's force in Kumassi was communicated by two fugitive slaves from Bankra. After breaking all communication with their rear, the column marched forward, arriving at Essianimpon, where Sartorius set off to open communication with the main body. The author then described the arrival of the Glover column in Kumassi, the appearance of that town, and the dissatisfaction of the native contingent at leaving it so hurriedly. He sketched the return march to the coast, and summed up the assistance rendered, in his opinion, to the main body by the operations of the contingent. The languages of the native allies, the products of their country, their style of living, and the supply of gold were briefly mentioned.

Mr. BALL, after remarking that no one could fail to be satisfied with the great importance of Sir John Glover's Expedition, adverted to the question of the duty of this country with reference to these African tribes. It was his opinion that a great country coming in contact with an uncivilized people had forced upon it duties from which it must not shrink if it would avoid the condemnation of posterity.

Extracts from a letter which had been received that evening from Colonel Gordon, who wrote from the River Lobat on the 26th of June, were then read by the President. The communication showed that the writer was taking energetic steps to put an end to the slave trade in that region.

Extracts were also read from the journal of Lieutenant Cameron, with reference to the East African Expedition.

Dr. SCHWEINFURTH'S paper, "On the Oases of the Lybian Desert" was then read by Mr. THOMAS, one of the Secretaries.

In undertaking, at the flattering call of the President of the Geographical Section, to present a report to this distinguished assembly of the results of my last journey to the Lybian Desert, my principal object is to testify to the high interest which, in more than one respect, belongs to this part of Africa, hitherto so much neglected by science.

The Lybian Desert, comprising, as it does, one-third of the Sahara, is represented by one of those three white spots, which appear on our maps of Africa, and which present the problem which has yet to be solved of this mysterious part of the world.

Up to the present time, the knowledge we have possessed of the peripherical parts of these immense areas has been very meagre, and, strictly speaking, the well-known oases of Augila and Siwa, as also the chain of the large and small oases in the east, have formed, for the last half century, the limits of these large gaps in our geography. It is only lately that the districts of Tibesti and Runga, on the western margin, have been added by Nachtigall, and, the same distinguished traveller promises to throw great light upon the southern border—Wadai and Darfur. Last winter a great portion of the eastern border of the white spots I have just mentioned has been added to our knowledge of descriptive geography, and naturalists for the first time explored this region from every aspect.

The expedition for the exploration of the Lybian Desert, conducted by Gerhard Rohlfs, who was accompanied by three of the most distinguished learned men of Germany, will not only present us with a more thorough and exact topographical and hypsometrical picture of the configuration of this waste region, founded on careful measurement, but will also reveal to us its geology, zoology, and botany, whilst the photographs of the temple inscriptions will form a mine of historical reference for the antiquarian. In time numerous publications will inform us of the brilliant results of this undertaking, which will form an epoch in the strictly scientific exploration of Africa.

Encouraged by the example of the bold attempts made to cross the deserts of Australia, which were made in spite of the want of water and of competent guides, I resolved to contribute my mite towards a more thorough knowledge, especially as regards natural history, of the deserts of Lybia.

Without taking any direct part in the expedition undertaken by Rohlfs,* through the generosity of the enlightened ruler of Egypt, but looking at the common object to be pursued, along with the natural philosophers engaged in it, the portion of the extensive district to be explored which I had selected for myself was indeed very small in comparison with theirs. However, the narrow limits of my field of operations the better enabled me to penetrate into every local detail calculated to throw a gleam of light over this *terra incognita*. "Plus habet hic viae, plus habet ille vitae," says Claudian, and this saying reconciled me to the circumstance of my tour of this year only having been extended over certain latitudes and longitudes.

The great oasis called el-Khargeh (the outer) was the field of operations offered to me during the first four months of this year, whilst the oasis, Dakhel, the basis of Rohlfs's expedition, three days' journey westward, is called by the Arabs the inner one to distinguish it from the former. For the last forty years these oases have not been visited by any traveller of scientific attainments; even the stream of tourists which pours over Egypt every winter has left them untouched. From this it will be abundantly evident how much of what is new and unexpected is presented by them to the natural philosopher.

I left the town of Siut in the beginning of January, and after a march of five and a half days, having traversed 190 kilometres in an almost southerly direction, I reached the little town of el-Khargeh, the capital of the great oasis. At the end of April, after having made myself thoroughly acquainted with every part of it, 120 kilometres in length, I entered upon my journey back, by way of Girgeh, and after a forced march of two days and a half, during which I travelled 130 kilometres in the direction of E.N.E., I again found myself on the shores of the Nile. The cartographical result of my exploration of the great oasis was a triangulation founded on a measured basis of 3½ kilometres.

In what follows I shall first of all describe its outward condition. The great oasis is bounded in its whole length towards the east by a line of cliffs, running in an almost straight line from north to south, and towering nearly 1000 feet above the bottom of the oasis itself, which is 300 feet above the level of the sea. These cliffs bound the table-land that separates the oasis from the valley of the Nile. The plateau rises on the opposite side conformably to the strata that compose it, so gradually that it only reaches the height of the eastern border of the oasis at a great distance. Thus the great oasis resembles the bottom of a gigantic valley, the width of which appears very much to exceed that of the Nile in its broadest part. It is bounded only in its extreme northern part by the sides of imposing rocks, which in the form of steep mountain chains have detached themselves from the mass of the Lybian plateau, whilst in a similar manner, projecting narrow-ridged mountains are

* The part of the district surveyed by Rohlfs's Expedition comprehends seventeen square degrees.

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also peculiar to the eastern decline, which, however, seen from a distance, present the appearance of a continuous wall. The picturesque forms of rocks thus torn asunder are in their upper parts composed of the same hard, glittering reddish, nummulite limestone which covers the greater part of the Lybian plateau; in their lower parts these mountain sides consist of chalk banks, frequently of the most dazzling whiteness, the latter of which like shining battlements or bastions are spread over the entire length of the mountain. Such is the frame to the singular picture formed by this landscape which presents itself to the eyes of the traveller, in a manner so entirely different from the usual appearance of the valley of the Nile, as soon as he has reached the Katabathmos which leads down to the great oasis of Thebes.

We must not regard the great oasis itself as an uninterrupted verdant plain; nothing would be more erroneous than this idea. From the top of the eastern precipice, nothing presents itself to the eye of the spectator but the same monotonous yellow, which, as soon as we have left the corn-fields at the Nile, is the constant companion of the traveller, a monotonous alternation of high sand-dunes and desolate plains of gravel or sandstone, with black spots here and there, and dark green patches. These are the arable portions of the desert: the springs surrounded by tall acacias, and the neighbouring fields, palm-groves, brooks, and ponds enclosed with reeds. Little islands in the sandy desert are the oases within the oasis, and they realise the great picture of the entire desert; which, as Strabo says, may be likened to the skin of a leopard, which represents them in miniature.

The impression which the traveller receives as soon as he has put his foot upon the cultivated soil of the oases is altogether different. Here he is struck with the imperishable creation of the vivifying element, bubbling up as it were from the innermost depths of the earth; smiling, verdant plains, and shady palm-forests, the equal of which we seek for in vain amongst those on the Nile. He sees murmuring brooks and rivulets gliding their speedy course along—here so guided by human hands that in their passage they often cross and recross each other at different levels, there expanded to ponds and morasses; but all having their source in springs overshadowed by towering trees, and separated by newly-sprouting turf banks from the still greener fields. The rural charm of these cultivated spots is still more heightened by the singular aspect of the plains of magnificent green, which, now rising and falling in graceful waves, and again ascending terrace-like to the overflowing springs, offers itself to the eye that has been accustomed to the uniform level of the valley of the Nile. In contrast to the wilderness over which we have passed, this affords a picture of the most enchanting freshness and vigour; here, an active mass of plant and animal life is crowded into the narrowest space—there, the direct contrary is visible over the entire continent of Africa.

The number of the inhabitants of the great oasis is stated to be 5700 souls, which are very unequally scattered over the ten places that are inhabited. Of these, Khargeh alone counts 3000, whilst Beris, the southern town, has only 1000 inhabitants. The continual dread of being surprised by Tripolitanian hordes, compels them, armed though they be with firelocks, to confine their habitations to certain secure positions. The little town of Khargeh, for this reason, presents a fortification of a very peculiar kind. The houses are not built in and near the streets, but over them. The inner part of the town, therefore, called Ndällema, which signifies *darkness*, contains streets, which in every respect resemble a place where the houses are built on piles, supported by rough beams, in which the inhabitants are only able to grope their way in a stooping posture.

The inhabitants, although their language differs very little from that of the Egyptians of the present day, are evidently of very mixed descent, and in the type of their physiognomy betray no Egyptian characteristics. Their thin lips, long, narrow noses, and a slanting cut of the eyelids, distinguish in the clearest manner the expression of their countenance from the sharply defined type of the tribe of Pharaoh. In the inhabitants of Khargeh we look upon the remains of one of those numerous Lybian races which are numbered in the list of hieroglyphical nations, and which at all events belonged to the Berber race, to the same Lybians, who exhibited by numerous feuds a hostile resistance to the inhabitants of the valley of the Nile, and whose civilization, to judge from the plants cultivated, as well as from history, has not, like that of the Egyptians, proceeded from south to north, but from the north, that is to say, from the Mediterranean Sea.

The inhabitants of the oases are distinguished from the Egyptians by a signally yellow complexion. It is a common saying in Siut and Girgeh—the people of the oases are pale and yellow, for they always suffer from fever. In fact, intermittent fevers, especially during the hot season, are the order of the day, for then the air is impregnated with miasmatic exhalations, arising from the culture of rice. In their customs, likewise (I allude only to the people of Khargeh), they differ considerably not only from the Egyptians, but also from the Bedouins, who have settled on the western border of the valley of the Nile. Situated on the great caravan high roads of Darfur, a great many of the customs of the Sudan have become naturalised in Khargeh, whilst now and then even heathen reminiscences of antiquity are to be met with. The people of Khargeh are generally very tolerant, and at the same time exceedingly lax Muhammadans; have a small perception of the difference between clean and unclean; hold the prescribed prayers in contempt, and scoff and jeer in married life, with a freedom unheard of, at all the laws of the prophet. With exception of smallpox, partly held in check by compulsory vaccination, contagious diseases are unknown in the oases. Coptic Christians, however comparatively recent may have been their conversion to Islamism, have disappeared from amongst the population, and not a single tradition has been handed down from the Christian era.

Nevertheless, so much plainer are the testimonies of the past, which proclaim the former prosperity of the oases. Five large temples, the origin of which reaches to the fifth century before Christ, point to the ancient relations to the valley of the Nile, which, according to inscriptions on Egyptian temples, refer us back to the 15th century; whilst seven strong Roman castles, of the time of the early emperors, reveal the important part which this now desolate province once played in the Roman empire. Hundreds of wells, now filled with sand; the grand Necropolis of Hibe; the capital; the for the most part well preserved remains of numerous dwelling-houses, and dovecots, ruins of convents, and chapels, distributed over the entire oasis, even to its most desolate parts, all testify to the largeness of the former population, and to the immense extent of its cultivated portion.

With exception of the old Egyptian temples, all the above-named buildings are constructed with unburnt bricks, and, in consequence of the scarcity of rain in this quarter, are in a state of great preservation. The subsequent depopulation of the country has contributed to their preservation.

The large Roman castles, of which there are none to be found in the Nile Valley, are deserving of the greatest interest. Four of the largest are built over and around the ancient temples, whose fore-courts, subsequently renovated, bear well-preserved Grecian inscriptions, which give the date of their construction. We find there the names of Titus, Galba, and Trajan, as well as those of the respective Eparchs, and army commanders; also those of the three principal towns, Hibe, Kysis, and Tchonemyris, the sites of which can be established with the greatest certainty. The

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area of the castles is from 50 to 60 metres square, and the surrounding walls are 15 metres high, and from 3 to 4 metres thick. The large bricks are joined together in such a way that in each layer the horizontal line of the bricks deviates by 60 degrees from that of the superincumbent layer, so that everywhere three differently joined layers are visible. The surrounding walls are generally double, and held together by arches, whilst the intermediate space is occupied by the stairs leading to the battlements. Moreover, massive round towers add to the solidity of the masonry. Inside the wall the temple is surrounded by a number of small arched spaces, irregularly traversed by passages and corridors. Here were the quarters of the garrison, which, according to a historical notice, included two squadrons of Germanic cavalry. Close to the castle of Dush is still to be seen the dwelling of a commander in the time of Trajan, in excellent preservation, consisting of several high arched saloons.

The ancient inhabitants of the oases must have been accustomed to much greater comfort in their habitations than that enjoyed by the present generation, whose low huts, built of mud and palm branches, appear to be constructed in the rudest manner. By the use of arches they were enabled to dispense with wood, whilst at the same time they were able to give a noble form to their buildings. The most signal example of this is to be found in the great Christian necropolis of Hibe, in the vicinity of Khargeh, whose preservation has remained so perfect, that in perambulating its long streets it is only the portions of mummies which lie scattered about, and the large heaps of grave clothes which are brought to light by Muhammadan desecraters of graves in digging after hidden treasure, which give us the impression as if we were still living in the first centuries of Christianity.

This necropolis commences at the foot of the Gebel el Ter, and consists of more than two hundred small and larger mausoleums, covering a slope extending towards the south. Ornamented with cupolas and pillars with niches and entablatures, these mortuary constructions betray more harmony with Roman than with Greek architecture, and deviate in the strangest manner from everything which Egypt has to offer in this respect. At the same time, this Christian necropolis furnishes the most interesting proof that embalming was certainly practised here by the Christians of the first five centuries.

There are few places in the world which can furnish to the spectator a more eloquent picture of the slowness with which time works in the transformation of surfaces, such as the desert valleys of Lybia, where a thousand years appear to have passed away as if they were only a day. This fact impressed me deeply, as I once suddenly found myself in a distant part of the valley of Gebel el Ter, opposite the side of a high wall of chalk, covered with inscriptions dating through a series of centuries. Here a certain Herakleos relates, in plainly written Grecian letters, that on this spot he had sacrificed hens, doves, and other objects; there, at the end of a demotic inscription, we find the date of the reign of one of the Ptolemys, or a contemporary of Charles the Great has scrawled over it in cufic characters, or the eye lights upon an "Eleison me," written in red, an "Apakire" (holy father) of the time of Constantine scratched into the stone; and yet the thin sheet of chalk on which the red characters are written has not yet been able completely to detach itself from the rocky mass. From this we may be able to comprehend the immensity of time it must have taken to smooth the sides of the rocks. Of all the impressions which force themselves upon the travelling natural philosopher in Africa, there is none more enduring than that which he receives from the age of the present condition of this continent.

The present cultivation of the great oasis is founded on the existence of seventy-five active springs. They have all their origin in the earliest antiquity, and empty themselves through pits artificially hewn out, from 60 to 100 metres deep, and one metre in diameter. The most ancient hieroglyphical texts make mention of this system of irrigation. The present inhabitants have no idea of opening new springs, but employ all their sagacity in utilising those already existing, filled as they are with sand. There is in the desert a particular order of divers, who for the small sum of 100 copper piastres (equal to 4 shillings) per ell, at the imminent risk of their lives, will undertake to clean out the wells. By means of heavy iron pipes attached to long cables, which are drawn up and down, the inhabitants are able in many cases to cause a spring to force its way through the sand, without having recourse to these divers.

In the Dakhel oasis borings have been made within the last few years, by an Egyptian engineer, which hitherto have, in every case, been attended with the best results. At a depth of from 60 to 100 metres, water is found everywhere in the oases, and in every place the stock of subterranean water appears inexhaustible. If more attention were paid to the boring of Artesian wells, it would be easy to restore these provinces to their former prosperity.

Whence arises this inexhaustible provision of water, in the depths of the earth? This question has already been attempted to be answered in various ways, but no explanation has been given in harmony with the geological condition of the Lybian desert. It was formerly thought that they were situated at a good distance beneath the level of the Nile Valley, and received their water from that river, by infiltration through the lower strata; it was believed also that this connection might be proved by the periodicity of the wells. All these theories have proved to be erroneous. The height of the oasis in relation to the sea is nearly the same as that of the Nile in the same latitude. A subterranean fall of the Nile waters to the west is rendered impossible by the rise of the strata in this direction; the supposed periodicity could not be recognized by any of us.

There is a greater probability in the hypothesis according to which the water of the oasis has its source in the Nubian Nile, probably above the cataracts of Wady Halfa. The greater height above the sea at this part of the Nile, and the geological features of its valley would support this hypothesis, and to the facts above stated must also be added the geographical arrangement of the valleys of the oases which shows a chain running tolerably parallel to the Nile Valley, which beginning with the oasis called Kaeb, ten hours west from Dongola, appears to be connected with the oasis of Khargeh and Dakhel, by means of those of Selimeh, Kurkur, and Shebb.

The supposition that the waters of the oases originate in the waters of the Tsad Lake, now disappearing in such an inexplicable manner, is scarcely to be accepted. As is well known, this great lake, apart from the Seistan Lake and the Tanganyika, is the only sweet inland water for which, so far, it has not been shown that there is any outlet. Nachtigall, in his journey to Runga, gained the information that the waters of the Tsad extend periodically in a north-east direction, extraordinarily far into the Sahara. The geological features of the latter are in perfect harmony with this hypothesis. One circumstance, however, which, in my opinion, appears to refute all these theories, must be considered in reference to the springs in the oases. All these springs, wherever they rise up directly from the earth, are thermal; and their temperature, varying from 25° to 30° Celsius, exceeds by far the average temperature of the year, of the districts in question, consequently it must also exceed that of the upper strata of the Sahara.

Another question, which appears to be closely connected with those we have just touched upon, is this:—Are there from the Egyptian Nile Valley westward visible traces of the bed of a former current, through which the Nile might have flowed? By our last explorations in the Lybian Desert this question has been unanimously negatived. On all our maps of Africa hitherto there

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has figured an imaginary system of oasis valleys, which as Bahr-bela ma—that is, river without water—used to be connected with it. Nevertheless, Bahr-bela ma is in desert countries a frequently recurring local designation for valleys and sand-wadys, which in some places reminds one of the dried-up bed of a river. Even the Lybian Desert has places of that kind to show; nevertheless, a continuous fall in a valley to the north exists nowhere, except that of the oasis chain already pointed out. The plateau between the great oasis and the valley of the Nile offers neither valleys nor hills which tower even to the height of 100 feet above the adjoining plains; in fact, on tracts which it takes hours to travel over, the land is so wanting in every topographical dissimilarity that we should be obliged to sketch stones if we were to attempt to fill up the maps of these places with details of any kind.

The conclusion that the Nile in times past has taken its course through the chains of the oases is contradicted by the condition of the soil of the oases themselves, which presents only the uncovered strata of the middle chalk formation, and betrays no traces anywhere of the clayey alluvial land of the Nile. There is no fish in any of the waters of the great oases, nor in that of Dakhel; it is only in the ponds of Siwa that a species of *Cyprinodon* exists. The botanico-geographical facts which we shall have to consider shortly also contradict most decidedly the above-mentioned hypothesis. A short survey of the geological relations of the Lybian Desert might be of service for the further ventilation of the subject of springs and rivers. According to Zittel's explorations the formations which present themselves to our views in this region are the diluvium, the miocene, the eocene, the upper and middle chalk.

Diluvial formations are met with only in one spot, between Khargeh and Esneh, represented by a travertine, which betrayed, by its impressions of leaves and grass, the entirely changed nature of the present Lybia. Nummulite lime and white chalk play the principal part in the composition of the Lybian plateau. The strata strike usually from south-west to north-east, and incline gently towards the Nile Valley, so that the further the traveller penetrates into the desert, towards the west, the older are the strata which he has to expect. It is only in the north of the district that an exception to this rule is visible, for there the nummulite formation sinks gradually towards the west, to serve as the bases of powerful miocene formations, which rise up in mountains around the oasis of Siwa, and are connected with the Cyrenaika.

Amongst the eocene formations, a hard silicious limestone, belonging to the lower nummulite formation attains in the greatest development, and forms the surface of the largest part of the tract of the desert, situated between the oases and the Nile. The road often leads for hours over these cliffs, which are sometimes dazzling white, and at other times brilliantly red; and they sometimes offer to the view the most deceptive aspect of endless glaciers. Under this hard lime, characterised by alveolites, there lie soft marly layers containing lucinæ and operculinæ, of the latter of which entire strata are to be found.

Immediately under the operculinæ strata, we often see everywhere on the sides of the rocks of the oases a snow-white limestone, which, by the broad walls and projections it forms, gives to the landscape such a picturesque appearance. This is the representative of the white chalk of the north of Europe; but it abounds much more in petrifactions than anywhere with us, and most resembles the chalk of the Paris basin.

Under the cretaceous limestone begins an agglomeration of very laminated marls interrupted by banks of clay and lime. These marls, which in their upper parts are green and grey, attain great thickness; they contrast distinctly from the superincumbent white walls of the chalk. Underneath, the marls become dark brown and brick red. The latter exhibit an agreeable red colour, and from time immemorial have been exported from the oases to the Nile. The hieroglyphical texts give to these red earths the name of *mensh*. The above-mentioned inscriptions at Gebel-el-Ter and in the necropolis are all written with this ruddle. In the Egypt of the present day the red earths are used for colouring walls.

The most surprising thing in the green and red marls is the mass of hydroxide of iron, of petrifactions, of pseudo-metamorphoses, nodules, nodes, and kidney-shaped objects, with which the ground seems strewn for miles.

Further down, and still alternating with green marls, there are extensive banks of argillaceous limestone, of a red and yellow colour, with millions of the *Exogyra Overwegii*, of which, having become disintegrated, whole hills are exclusively composed. Here also were found the interesting ammonites belonging to the group of the ceratites, and one entire fauna of these strata appears to consist of new and unknown kinds.

The marls under the exogyra strata contain the alum which, next to dates, forms the principal article of export.

In the continual alternation of marly and quartz sandstone, we perceive a gradual transition from the exogyra strata to the true sandstone which finally prevails on the ground of the oasis. This sandstone extends without interruption to the west and south of Dakhel and Khargeh as far as Sudan, and as it contains nothing but fossilized wood, we can only regard it as belonging to the middle cretaceous formation, and to the uppermost stratum of the highly developed Nubian sandstone formation.

The marls imbedded in the sandstone form the arable land of the oases, and the springs issue between them and the firm strata. Whence run these springs which flow here almost at the level of the sea? Do they discharge themselves deep under the coasts of the Mediterranean Sea, between Egypt and Cyrenaika, somewhat similar to the disappearing brooks in the north of Adria? That is a question which there, at some future time, perhaps, measurements which have still to be undertaken of the salinity of the sea at different depths, will furnish a solution.

The subterranean water of the oasis cannot be calculated, but we may safely assume that its volume is equal to that of a first-class river.

After becoming acquainted with the soil of the great oasis, let us turn our attention to the use which can be made of it by man. The irrigation of the fields is in a most primitive state. In the oases neither draw-wells nor wheels for lifting water are known. In the valley of the Nile they make the water, so to say, run up hill; here it is made to run naturally to any spot we like. In order to lift the water to any necessary height, we have only to surround the spring with a crater-like dam, which, as a rule, may be taken to any height, and which in general is from 40 to 50 feet. The principal difficulty of agriculture is the unequal distribution of arable soil, and the springs which may be available. Where excellent soil exists, there frequently the well is wanting, whilst at other times it is necessary to bring the water from a great distance, in order to avoid the salt deposits; for besides alum, there is common salt and Glauber's salt in whole beds, between the fertile marls of the Nubian sandstone. This is the reason why so much water is lost in the great oasis, and after becoming brackish it spreads over the lower plains, forming ponds and pools bordered by rushes, and filled up with Charae, which for their part have an injurious effect upon the climate.

In fact, these ponds of the great oasis contain only the surplus stock of the water used for irrigating the fields during the winter months. In summer, when the cultivation of rice requires all the available water, the ponds evaporate, and, as a natural consequence, fever and a plague of gnats follow.

Apart from the salt properties of the soil and the scarcity of water, there is another element of the desert which threatens destruction to cultivation. These are the moving sands, which, in the form of sand-hills, usurp the

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finest part of the oasis, covering the fertile soil, and burying the palm groves. The small town of Khargeh is placed in a difficult position by this hostile element, and the sand-hills are advancing continually.

Nowhere do I recollect having seen similar masses of sand, which remind us forcibly of the snow plains in our own highlands, which they exactly resemble in their formation. Following the prevailing direction of the wind, all these sand-hills go from north to south, with a gentle inclination to the west, forming in this direction a steep crescent-shaped arc. The relative elevation of these sand-hills amounts here to from 30 to 100 metres.

On the north side of these sand-hills, beaming in the blazing sun, on a gradually inclining slope, the foot steps out firmly on the fine lamelliferous soil; on the steep southern declivity, however, it sinks into the loose mass of earth, which, like a snow-heap, ends in a sharp edge. From both sides sharp-edged notches, blown up by the wind, fall arch-like from one height to another, connecting the several sand-hills with each other. It need hardly be added that the sand-hills exclude all vegetation.

The largest sand-hills, however, begin only in the west of the oasis of Dakhel, where, insurmountable for camels, they prevented the advance of Rohlfs's expedition, and forced them to take a north-north-west route. Rohlfs himself, the only one who has travelled through the Sahara in every direction, confesses that in no other part has he ever seen sand-hills of such height and extent.

The cultivated plants of the great oasis are of greater variety than might be supposed, from the circumscribed limits of the arable soil. With exception of the hogs-bean, which in the Egyptian valley of the Nile is an object of extended culture, we find there every other kind of plant. The cereals which are grown are rice, wheat, barley, and the caffercorn. Maize, sesamum, and linseed are not cultivated in the great oasis; just as little are cotton, lupines, and safflower, which are only now and then found in gardens. Rice is only sown in the height of summer, and its cultivation is restricted to the northern half of the oasis. Wheat and barley are planted during the winter to the whole extent of the oasis. The harvest of these cereals is in the middle of April, about a fortnight later than in the neighbouring valley of the Nile. In the same way as the cultivation of rice is restricted to the north side of the oasis, that of the caffercorn (Durra) is limited to the south side. For the same reason the principal food of the inhabitants is, according to their abode, rice or caffercorn. Their stock of wheat is insufficient for their wants, and must be eked out by importations from the Nile. Barley is generally reserved for feeding domestic animals. Moreover, wheat in the oasis degenerates very easily; it is consequently necessary to obtain every other year fresh seed from the Nile. The small kind of degenerated grain is called "sihny." Barley is not influenced by the nature of the soil, but thrives well under any circumstances. The rice of the oases is of excellent quality, and deserves to be exported if the natives were enabled to grow it in larger quantities than is required for their own consumption.

As is well known, the most important branch of agriculture for the inhabitants of the oases, is the cultivation of the date tree, their wealth being estimated according to the number of trees which the one or the other possesses. Apart from the indigo, dates furnish alum and red chalk, this being their only article of export. The number of female trees in the great oasis is estimated at 80,000, but I believe the number to be under estimated, for reasons easily explained. The taxes are based on the number of palm trees, and the area of the cultivated soil. Moreover, the government also levies a tax on the baskets (Guffer) which are plaited out of the leaves. For every 100 palm trees, thirty baskets must be delivered at Siut, where resides the Mudir charged with the government of the oases.

Notwithstanding the spread of their roots, date trees also here require an artificial irrigation, the moist ground caused by the springs being inaccessible to them. The palm-groves are watered four times every month. It is seldom that the trees in the oases attain to a height of more than 30 feet, but their width and the leafy abundance of the tops, more especially the surprising length of the several leaves, testify to the luxuriance of their growth. The finest trees are found near the village of Bulak, six hours south of el-Khargeh, and it was here that I had the opportunity of meeting with the unheard-of existence of a date tree possessing six-fold ramifications of long, shooting branches. This tree, the like of which is probably not to be found in the world, is called "Nekhl-el Hadji Manzur," and is of the feminine gender, and about sixty years old. Each of the six tops furnishes a rich harvest every year. On other trees I observed a single formation of branches now and then at the side, only two instances of which I had observed in Egypt up to that time.

In the way of domestic animals, donkeys, cows, and buffaloes are reared in the great oasis. Sheep degenerate easily there, and have always to be replaced by those from the Nile Valley. In the great oasis there are about a dozen horses, which thrive well. On the other hand, it is absolutely impossible to acclimatize the camel, not one of which is to be found in the great oasis. It is not by reason of the scarcity of fodder, for there is no lack either of suitable pasture or of straw, clover, and green food, but they succumb, as I was told, to the damp, miasmatic air of the summer months, as well as to the plague of midges and flies.

The number of dogs and cats which we see about the dwellings are very limited. Of fowls, only pigeons, hens, and turkeys are kept.

The extraordinarily large number of mammals harboured by the great oasis, constituted one of the principal objects which I proposed to study. With the aid of various traps which I took with me I was able to catch a great number of specimens of these animals, preferring, as they do, a night life, and I filled several boxes with skins and skeletons.

Five species of beasts of prey are frequently met with in the great oases, the wolf-hound *(Canis lupaster)*) the Lybian lynx *(Felis libyca)*, the Nile fox, the jackal, and the fennek *(Megalotis cerdo)*. Of the latter, the smallest representative of the wild dog genus, I brought ten living specimens to Europe, in good condition. The fennek is the most frequent of the five beasts of prey in the oasis, and is caught in snares by the natives in a simple and ingenious manner. They despise the flesh of no wild animal, provided it is killed according to rule. There appears to be no hyenas in the oasis, or, at all events, they are only to be met with individually on occasions of the passage of the great caravan of Darfur, when they are allured by the fallen camels. In the south of the oasis, the dog hyena *(Canis pictus)* is said to make its appearance now and then.

The large number of small gnawing animals *(Meriones* and *Dipus)*, which inhabit the desert in the vicinity of the cultivated ground, with whose holes the soil swarms, form the edacious conditions for such a vast number of robbers of the larger and smaller sort. They are continually grubbing in the ground for mice. The Lybian lynx, however, will frequently attack the grazing goats in broad daylight. The Nile fox and the fennek sneak into dovecots and fowlhouses, and thus prevent the natives from paying greater attention to the rearing of fowls. Locusts and lizards *(Acanthodactylus)* are devoured by the fennek with especial predilection, their great number making the conditions of his existence much easier. But it is the date especially which is the most welcome dish to the numerous beasts of prey, and in the furthermost valleys of the desert, the kernels which lie scattered about in every direction betray the track which they have taken.

The feathered tribe of the oasis is peculiarly circumstanced, on account of the small number of stationary

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birds which it harbours in winter time, and the multitude of birds of passage which find a resting-place there in the spring and autumn. During the months of January and February I counted about a dozen of the first-named class, among which were two species which hitherto had been observed only in Arabia and Nubia. In the first part of April the greatest number of birds were to be seen, amongst which, singularly enough, I observed neither ducks nor geese, although the numerous waters of the desert would appear to invite a visit.

Before concluding, I will add a few words respecting the flora of the great oasis, the explanation of which was the principal reason which induced me to visit it. My observations and collections agree with those of Dr. Ascherson, who accompanied the Rohlf expedition, in such a signal manner as to lead to the conclusion that all these oases in the east of the Lybian Desert have one and the same flora, which, in spite of the fewness of their species, nevertheless present an unexpected contrast to the vegetation of the Nile Valley on the one hand, and to that of the valleys of the desert on the other. What we obtained of the wild-growing kinds amounted to 225 species, and we do not believe that even a more thorough exploration would result in the increase of this number by more than a fourth.

After deciding upon the existing species, we arrived at the following botanico-geographical conclusion:—Nearly the half of all the species of plants we met with may be considered as being connected with the culture of rice. These, with few exceptions, point to India (for instance, a Lemna), are types of the Mediterranean flora, and are nearly all again met with in the environs of Alexandria, under similar conditions of existence, but are mostly totally absent in the entire valley of the Nile. We have, however, enriched our catalogue of the Nile flora with a number of species which hitherto were not to be found near Alexandria. One thing is especially remarkable about them, and that is the predominance of leguminous plants; which is explained by the quantity of Alexandrian clover, which has been introduced with the cultivation of rice, for in winter every rice-field is turned into a clover-field. In the southern half of the great oasis rice is not cultivated. The leguminous plants with which all the fields in the north are filled are also absent. The wheat and barley fields in the same district are almost free from weeds. In the south of the oasis we find generally a more uniform flora, bearing a greater similarity to that of the desert.

Very few plants of the black soil of the Nile reappear in the oases, which, as regards the flora, are as characteristic as are the sharply defined features of the inhabitants for the Egyptian race. The representatives of the flora of the Theban Desert, which we find on the Arabic side, on the borders of the cultivated district of the oasis, are, however, more numerous, but they do not remind us in the least of the variety which exists in the valleys between the Nile and the Red Sea.

What strikes us most is the scarcity in the oasis of those species of plants which undoubtedly belong to the borders of the tropics. Of this group I could only mention one shrub with certainty—the *Cordia subopposita D. C.*—of which, however, it is still doubtful whether it may not have been recently brought into the country by the Darfur caravan. Two others, the *Balanites*, and the *Calotropies*, may indeed be regarded as of tropical form, but we also find single specimens of them at a great distance from these borders. Calotropis branches were found in the old Egyptian tombs of Dakhel. This rapidly-spreading plant, which the present inhabitants of the oases hang above their doors as a charm against evil spirits, has been consequently indigenous in the oases for the last 2000 years.

It follows from what we have said that the circumstances of the vegetation of the Lybian oases enable us to perceive no connection between that and the flora of the Nile Valley, but they do enable us to see the connection between it and the flora of the Mediterranean coast lands; and that, however near the two districts may be to each other, they have very little in common of a nature calculated to impress their flora with the seal of affinity.

Strictly speaking, the flora of the Lybian Desert in the regions traversed by us, especially between the Nile and the oases, belong probably to the regions which are the poorest in plants of any that we know of in the world. Our observations there were confined to a dozen sorts, which moreover represent an extremely small number of separate kinds. Still the desert even in this its most torpid shape, appears to be nowhere wanting in vegetable germs. A north-west wind charged with a minimum of moisture is able at once to vivify the dormant energy which through long years has lain in a state of apparent death, and to produce that semi-vegetation to which we may give the name of botanical *vita minima*. If occasionally there should fall here and there an exceptional shower, such as we experienced early in February (to be sure, as regards many localities, 100 years may probably pass away before it comes to their turn to receive such a moistening), then the plants develop themselves to the normal life, corresponding to their ephemeral nature; they produce blossoms and fruits, and, with the aid of the wind, furnish the desert with fresh germs of life.

The principal cause of the remarkable scarcity of plants on the Lybian side of the Egyptian Desert is owing to the prevalence of porous limestones there, which are unable to make any economical use of the moisture which they have once received, whilst on the Arabian side the down falling rain carried far away over impermeable strata, or confined as in a cistern, may be stored up for a long time.

The problem of desert vegetation is however less to be sought for in the nature of the external conditions which environ it, than in those of their internal organization. Where the camel becomes strong and fat the horse may be starved to death, and the air of a rainless European summer, in which the crops wither and die, would suffice to cover the Lybian Desert with fresh and smiling vegetation.

Dr. SCHWEINFURTH afterwards made a few remarks in German (which Mr. Ravenstein translated) expressive of his gratitude for the reception he had met with, and congratulated England that her material prosperity had not interfered with the advancement of science.

Saturday, August 22nd.

Dr. CARPENTER read a paper on the result of the 'Challenger' researches into the physical condition of the deep sea. The paper, however, was essentially the same as the lecture delivered by the author on the temperature of the Atlantic at the Royal Institution of Great Britain in March last. (See our July number, p. 109.)

Monday, August 24th.

Mr. T. J. HUTCHINSON, late Her Majesty's Consul for Callao, read a paper "On the Natural Resources of Peru."

The author commented on our earliest knowledge of the history of Peru, observing that the country, even in early times, was as famous for its commerce and industry as for its precious metals. He considered the modern Peruvians to be the most industrious inhabitants of South America, as evidenced by their cultivation of cotton and sugar-cane, and dated the establishment of their commercial status from the beginning of the Pacific Steam Navigation Company's inauguration in 1840. The condition of native manufactures, joined to that of agriculturists, seem to point unerringly to success in a commercial point of view for a nation as it were instinctively industrious. The author then proceeded to notice the enormous amount of mineral

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wealth in the Andes, now about to be opened to the world by means of railways. Hitherto these rocky mountain masses had rendered intercommunication impracticable from the difficulty of transport across their almost impassable barriers. Foreign Office Reports were quoted, as furnished through the Admiralty from Rear-Admiral Cochrane, the present Commander-in-chief in the Pacific. Recent findings of guano show an approximate amount of 9,294,500 tons, and exports of nitrates from Iquique have increased cent per cent in less than three years. In the author's opinion, Peru seems likely to reach the position before many years of being one of the first South American Republics, as regards commercial prosperity. Drawings of various cuttings and tunnellings of the railways (some of which are now finished by the contractor Mr. Henry Meiggs) accompanied this paper.

ASIA.

Mr. DELMAR MORGAN afterwards read a paper "On Travels beyond Three Seas," by Athanasius Nikitin, Merchant of Tver, 1466-1472.

These memoirs were first discovered by Karansin, who paid a high tribute to their importance in his history of Russia; they have since been referred to by other writers, but no commentator has yet given a correct idea of the narrative or of its place in European literature. The present attempt to give an English version of these travels has been suggested by an article which appeared a few years ago in the *Transactions of the Imperial Academy of Arts and Sciences*, by an able Russian savant and archæologist, M. Sresneffsky, who devoted much labour and research to a critical review of the diaries of Nikitin. The few notes added are chiefly from well-known English works.

The 15th century, remarkable in the annals of Western Europe for a special desire to become acquainted and establish relations with the distant East, is not without its reminiscences to Russians, whose ancestors took their part in the progress of the times and the march of events, as far as circumstances would allow. The development of the kingdom of Muscovy, following the overthrow of the Tartar power during the reign of Ivan III., opened out new countries to the enterprise of Russian merchants, and, towards the close of the 14th and beginning of the 15th centuries, they traded with India, Persia, and Central Asia. Commercial intercourse was succeeded by closer political relations, and we read of interchanges of envoys between the Grand Dukes of Muscovy and the rulers of Transcaucasia and Persia. It was on the occasion of the departure of one of these embassies from Russia that Athanasius Nikitin, a merchant of Tver, started for the East. Taking with him his merchandize in two sailing ships, he descended the Volga to Astrakhan, where he was attacked by Tartars, and lost all his goods; but escaping himself in another vessel, after experiencing a violent storm in the Caspian Sea, he landed safely at Derbend. Here Nikitin and his companions were in the dominions of the Shirvan Shah of Shamakha, who received them kindly, but refused to accede to their request to be sent home to Russia. After wandering about Daghestan for some time, Nikitin at length set sail for Persia from Baku in 1466 or 1467, and landed at Barfurush, on the coast of Mazanderan. Thence he crossed Persia, visiting the most important towns and commercial centres, and arrived at Ormuz, on the Persian Gulf. Three years later, on his return journey through Persia, he visited the "horde" of Uzun Hassan of the Turkoman tribe of Ak-koinlu (white sheep), whose empire extended over the whole of Persia and a great part of Asia Minor, and at one time threatened to shake the power of the Turks. Nikitin described the unsettled state of the country, owing to the ambitious designs of Uzun Hassan and the revolts and rivalry of his sons and vassals; and his remarks are the more valuable, as they entirely confirm the records of the chroniclers. Sailing from Ormuz the week after Easter, 1469, Nikitin approached for the first time the shores of India at the Peninsula of Gujerat; he touched at Diu and Cambay, continuing his voyage to Chewul, where he landed and crossed the Ghaut Mountain, entering the Deccan and visiting the towns of Junir and Kulburga on his way to Beder, where he stayed for some time. Beder has now lost all its importance, but in those times it was the capital of a powerful Muhammadan state, and a great emporium for trade.

Our traveller visited the fair at Aliand (Allund), instituted in memory of Shah Alla ad Deen Hildji (1297-1347), who made himself notorious by his terrible march through the peninsula with 300,000 cavalry, and 2700 elephants, devastating the country. Nikitin also accompanied the Indians to their sacred city of Parvat, not Ellord, as Karumsin and others believed, but most probably Parvattum, or Perevattum pagoda, on the right bank of the Kistna (16° 12'), south of Hyderabad, described by Hamilton as the site of one of the Buddhist shrines, marked to this day by some beautiful remains. In Nikitin's time, this shrine was visited by pilgrims from all parts of India. It contained, among other objects of Hindoo worship, twelve temples covered with sculptures, illustrating the miracles of Buddha; a statue of that god, resembling that of the Emperor Justinian, at Isargrad, or Byzantium; a black ox of stone covered with gilding, &c. Among the other places of interest described, were Bidjnaghur, the capital of the great Indian kingdom; Rachiur, famed for its diamond mines; and Kulor (Culoor), a great industrial centre.

After the personal narrative of his journey, Nikitin records his observations on the country, and its products; the people, their morals, customs, and religion; the government, the army, &c.; and some of these remarks are the more valuable as they are not to be found in the writings of any of his cotemporaries.

It may be observed that, in his time, there were two principal kingdoms in India, the capitals of which were—the Indian Chiumidar-Bidjnaghur, and the Muhammadan Khorassan-Beder. Of the former, he communicated little, except that its prince, Kadam, was very powerful, and had a large army; but of the latter, he notes that the ruling classes were all Muhammadans of Khorassan, a proud race of conquerors, riding in armour, their Indian subjects poor, ill fed, nearly naked, swift runners, with shield in one hand, bow and arrows in the other. The Sultan's army numbered 300,000 men, besides elephants, and the contingents of his great lords or feudatories. The description seems almost fabulous of the splendour of the Sultan's Court, of the grand ceremonial processions on the Muhammadan festivals, and of the wars and military exploits of the great Lord Meliktuchar, attached to the suite of the young sultan.

After three years' stay in India, Nikitin departed from Dapul, then a prosperous seaport, on a 'tava,' or merchant vessel bound for the Persian Gulf. After being wrecked and falling into the hands of robbers, he reached Muscat, whence a few hours' sail landed him at Ormuz. He then travelled through Persia to Trebizonde, and, after crossing the "Stamboul daria," or Black Sea, to Balaclava, he could offer up his thanks with a grateful heart, exclaiming, "Thank God, I have crossed three seas."

By what route Nikitin returned to Holy Russia is uncertain; but as he died at Smolensk before reaching his native Tver, it may be inferred that his road lay through the territory of the Khan of the Crimea, and the Prince of Lithuania.

His record of his travels entitles him not only to claim rank as a distinguished Russian of the 15th century, but as worthy to be classed with Di Conti and Vasco de Gama.

M. N. DE KHANIKOF, in the name of his countrymen, thanked Mr. Morgan for the trouble he had taken to introduce Russian geography to an English audience.

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"On the Survey of Palestine," by Lieut. CONDER, R.E.

This survey is confined to Western Palestine, containing about 6600 square miles, which is bounded by the Jordan and the sea, and extends from Dan to Beersheba. It is divided into five geographical districts, two on the south comprising the hill country of Judæa and the plain of Sharon, the third containing the plain of Esdraelon and its boundary chains, the fourth the hill country of Galilee, and the fifth the Jordan Valley. The country of the Beni S'ab, or Shephalah, west of Nablus, was unknown until visited in this survey. The author describes the commencement of the work (1-inch scale) in October 1871, and the share taken in it by Mr. C. F. Tyrwhitt Drake, who died on the 23rd of June last. The map was prepared on Sir H. James's system of tangential projection, in sheets containing 30' of longitude and 20' of latitude. Six of the proposed twelve are complete, and three are in England. The first base was connected with the trigonometrical point at Jaffa, the second being established at Esdraelon: this was 4¼ miles long, and the difference between its measured and calculated lengths gave an error of only .03 per cent. The average length of the triangle's side was about 15 miles, but never greater than 10 in the Judæan hills; and every possible check appears to have been employed in all cases with an encouragingly minute amount of error. The rate of work rose from 60 square miles per month to about 180 in October 1873, and then, with an extra man, gave a steady average of 280. All is done on horseback, and the method is most fitted for military reconnaissance. The heights are obtained by Abney's clinometer, sketches of hill tops, aneroid observations, thermometrical readings, &c., and astronomical bearings were constantly obtained as rough checks. As to names of places, the author observes that the original Hebrew names are still to be found under slightly modified forms of the Arabic. The collection and correction of these, tending to elucidate geographical passages in Scripture, were carefully attended to. The number obtained was very great (seven or eight times more than in any previous map), averaging two per square mile. Seventy special plans of antiquities not before satisfactorily explored, are here mentioned; and seven churches and two sites of towns are stated to have been before entirely unknown. The antiquity of ruins in Palestine has been much exaggerated, many supposed to be Jewish or Phœnician turning out to be Crusading or Saracenic. The identifications of the altar 'Ad, the site of Ænon, Zaretan, Gilgal, Scopus, Oreb, Zeeb, Samson's Tomb, Archelais, Ecbatana, Sozuza, and other places mentioned in Scripture, were made during the survey, and various other points and discoveries of archæological interest are discussed. As to climate, there is an entire absence of ozone during the east wind; the mirage is not dependent on heat only, but requires also moisture; and the rise and fall of the barometer has no reference to storms in the Jordan Valley, though a safe guide in the hills. The forest of Sharon has been found extending for miles on the northern part of the plain; and altogether the seasons, rainfall and natural vegetation of modern Palestine resembles very closely that of Biblical times. The vine, now unknown, was once much cultivated. A volcanic centre has been discovered in the plain of Esdraelon, and a tertiary volcanic lake south-west of Carmel.

"Notes on a Recent Journey East of the Jordan," by the Rev. Dr. J. L. PORTER, D.D., LL.D.

Eastern Palestine is divided from Western by the valley of the Jordan, which extends from the base of Hermon to the borders of Edom, a distance of 150 miles. For about 130 miles its surface is below the level of the sea, its depression at one place being 1312 feet. This great chain gives the country eastward its most striking physical feature. Viewed from the west, it appears an unbroken mountain chain, but, when ascended, a table-land is seen to stretch from its summit into Arabia. The central erection rises into wooded heights, with an average elevation above the plateau of 600 feet: this is mount Gilead, while the southern table-land is Moab, and the northern Bashan. The western side of the country is deeply furrowed by ravines, three of which are historically important: 1, the Arnon, which separated the Moabites from the Amorites; 2, the Jabbok, which was the northern border of the Ammonites; and 3, the Hieromax or Jarmuk, the boundary between Bashan and Gilead. The country was the scene of some of the most remarkable events in early Bible history, such as the raid of the Eastern Kings upon Sodom and the conquests of Israel under Moses. Questions of importance arise in connection with those events: Are there any traces, monumental or traditional, of the aboriginal races, or can the line of conquests be followed? The ancient inhabitants had some very marked characteristics; they were to a large extent migratory; they were subject to wild outbursts of passion; they were celebrated for unbounded hospitality; they had a peculiar costume and a peculiar accent. It is therefore important to enquire whether there be anything in the physical features, natural resources, or geographical position of the country that would account for these characteristics, or whether any of them still exist. The author proposed to show the conclusions he had arrived at upon these and other points, while giving a sketch of his recent journey. He left Jerusalem on the 13th of April, but was unable to cross the Jordan at Jericho, because, as stated by Joshua, the river at that season "overfloweth all his banks." He travelled up the plain to Damich, and crossed a ferry beside the ruins of the Roman bridge, over which ran the ancient road from Neapolis to Geraxa and Philadelphia. He showed that the dress of the people beyond the river is different from that of the western tribes, and of a more primeval type; their pronunciation of certain words is also different. He ascended Jebel Osha, the highest peak of the Gilead range, and identified it with Mizpah, where Jephthah assembled the Transjordanic tribes. He also showed that Es-Salt is the Ramoth Gilead of the Bible. He travelled south to Arak-el-Emîr, and described the remarkable excavations and classic ruins of the palace of Hyrcanus. Thence he went to Heshbon, and pointed out how it commanded the passes from the plateau of Moab to the Jordan Valley, thus rendering it necessary for Moses to ask permission of Sihon to pass through his territory. The western brow of the plateau is deeply furrowed, and the projecting peaks near Heshbon formed those "heights of Pisgah" which looked "toward Jeshimon," *i.e.*, "the desert" beyond the Dead Sea. He described the ruins of Nebo, showing that it was a town which gave its name in ancient—as it does in modern—times to some peaks around it, one of these peaks bears a name which is probably a corruption of Pisgah, and the river from it is similar to that described in the account of Moses' death. The author went to Rabbath Ammon over a table-land rich in pastures, and dotted with ruined towns. He urged the importance of excavations at Rabbath, as likely to be productive of interesting archæological discoveries. He travelled thence to Gerasa, through the semicircular region of mountains skirted by the ravine of the Jabbok, and illustrating the statements in the Bible regarding the strength of the borders of the Ammonites. He suggested Neby Hûd, a noted sanctuary between the ford of the Jabbok and Gerasa, as the probable scene of Laban's covenant with Jacob, and proposed to identify Gerasa with the long lost Mahanaim. From Gerasa he made an adventurous journey through an unknown region to the plain of Haurân, following the line of an ancient road; and he gave reasons for believing that this was the route by which Abraham and Jacob entered Palestine, and by which Moses invaded Bashan. He denied the identity of Dera with the Edrei of Og, maintaining it to be the Adraha of the Peutinger Tables, and followed the Roman road there laid down to Bozra. Thence he went north to Jebel Haurân, visiting its old cities and describing their

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architecture. He argued that some of the private houses in those cities are much older than the Greek temples beside them, giving measurements of a few of the massive stone doors. Here were two colossal heads of Astarte, with the crescent on the forehead which gave that deity the name found in Genesis, Ashteroth-Karnaim. The ruined temples and palaces of Siah contain inscriptions bearing the names of Herod the Great and Agrippa; and there is one in Nabathean characters of a very remarkable type, apparently recording the erection of a statue to a certain Malkath about 30 B.C. From Kenath, he crossed the plain of Bashan to Mezarib, and then, turning southwards, passed over the northern ridge of Jebel Ajlûn, visiting several cities of Decapolis, and finally crossing the Jordan Valley to Bethshean. In conclusion, the author strongly urged the importance of a regular survey of the whole country, as calculated to illustrate Biblical geography and archæology.

Colonel BIDDULPH, R.A., communicated a short abstract of the journey of the Kashgar Mission, from their departure from Marri in the Punjab, on the 15th July, 1873, up to their return across the Great and Little Pamirs, in April last. Full notices of the progress of this expedition have already appeared in our columns, and will be found in the April number, p. 19, and also that of July, p. 139, to which we beg to refer our readers.

Tuesday, August 25th.

"On Surveys in Ireland," communicated by the Ordnance Department.

The circumstances connected with the Government Surveys of confiscated lands in 1586, 1609, and 1652 are here succinctly narrated—the last (the "Down" Survey) being given more in detail. After a sketch of the origin of the English Ordnance Survey, its extension in 1825 to Ireland (when the triangulation commenced on Divis Mount near Belfast), and subsequent operations are described, and the various uses to which the resulting maps may be put are recapitulated—the older surveys being shown to have been but portions of various oppressive plans, whilst the operations of the present scheme relieve all classes from unequal taxation, simplify the conveyance of land, and in various ways act equitably for the good both of individuals and the State.

A paper was then read by Captain ABNEY, "On the Multiplication of Maps and Plans in the Field."

The chances of victory are greater if the officers in command possess a thorough knowledge of the ground. Even the autumn manœuvres offer instances of this; and the escape of the Prince of Wales by taking a path through a bog, upon which his pursuers did not venture to follow, is a case in point. It is therefore important not only that every officer should be furnished with a correct map of the country, but likewise that there should exist facilities for multiplying reconnaissance surveys with rapidity, so that they may reach the hands of the officers concerned within a few hours after they have been made. The time when officers were obliged to sit up all night in order to furnish a few copies of plans has now passed, and maps drawn in lithographic ink can be multiplied at the rate of 100 an hour. Captain Abney considers that the necessity of using greasy ink, and of carefully guarding the prepared paper against finger marks and moisture detracts from the utility of this process. He thinks that the ink invented by him, which is not greasy, and by means of which three transfers can be taken from drawings made on ordinary paper, is deserving the preference.

In photo-lithography, which is particularly useful for enlarging plans, so that an officer charged with a reconnaissance may insert additional details upon them, he has likewise introduced certain improvements. He coats the paper with gelatine, and renders it sensitive to light by adding bichromate of potash. The action of light renders the salted gelatine insoluble in water, and incapable of absorbing it, and by placing this sensitive paper under a negative, upon which the black lines of the original are represented by transparent lines, and the white of the paper by an opaque deposit of silver, the lines printed on the gelatinized paper will become insoluble, whilst the white portions can be washed away with hot water. Thus far, Captain Abney's process is identical with that employed by Sir H. James. The paper, having been taken from the printing press, is then steeped by him in cold water, thus stopping the action of the light almost entirely; the surface moisture is got rid of by blotting-paper, and a soft gelatine roller, charged with greasy ink, is then passed over it. The greasy ink adheres to those parts which have been acted upon by light, and a facsimile of the original is thus produced. A transfer is then taken on zinc, and the paper may be rolled in again, for a second transfer. This system of printing, which Captain Abney calls papyrography, has been adopted in the army.

The same process is applicable to the multiplication of ordinary photographic views. In that case a reversed negative is transferred to gelatinized paper, and rolled in with lithographic ink. From this paper (and not from any transfer to stone or zinc) forty to fifty copies can be printed upon ordinary paper.

The equipment of each division of the British army now includes a lithographer's, a photographer's, and a typographer's waggon. These waggons are supplied with stores for a three months' campaign, and together with the Telegraph Troop of the Royal Engineers, they are placed under the Intelligence Department of the army.

Major JED. HOTCKKISS, of Virginia, expressed his satisfaction with Captain Abney's paper, and explained the manner in which reconnaissance surveys were made, and plans multiplied, in Stonewall Jackson's army.

The PRESIDENT, in thanking Captain Abney for his interesting paper, referred to several instances in the Franco-German War, in which the art of photo-lithography proved of great service.

"On the Reconnaissance of a new or partially known Country." By Captain WARREN, R.E.

In this paper Captain Warren lays down the experience gained by him in the course of the Palestine Survey, and furnishes valuable hints to explorers and others, whose business it is to supply maps from actual surveys.

"On the Russian Expedition to Khiva," by J. A. MAC GAHAN.

The Russian Campaign against Khiva was remarkable for the admirable way in which the expeditionary force was supplied with every requisite for a march of ninety days across a waste of sands. The operations of the Topographical Corps merit special attention. The Russians keep pace in the survey of the country with their advance in Central Asia. Even flying columns and embassies to neighbouring states are accompanied by officers trained to make surveys and to determine the position of places astronomically. The visits of Struve and Kaulbars to Khiva and Kashgar respectively, are instances of the kind. Flying detachments explored the routes leading to Khiva long before the late expedition was undertaken, and the expeditionary force never moved until the country as far as the next camping-ground had been explored by a flying force, and the amount of water each well would afford had been estimated. The only route not explored in this manner was that from Adam Krilgan to the Oxus, it being impossible to do so in the face of the Khan's troops, and hence Kaufmann's march came near ending disastrously. The information obtained by the Jighits or native guides could not always be trusted. The trigonometrical survey of Russian Turkistan is progressing favourably; and the time when the whole of Central Asia, as far as British India, will be laid down correctly on our maps, is not far distant. The extensive explorations carried on by Russian travellers but rarely become known to the outside world, for the Russians confine themselves to a dry *résumé* of

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facts. During the Khivan campaign the operations of the Topographical Corps were most extensive, and the surveys were of the most minute nature. On several occasions the surveyors, who were always to the front, narrowly escaped being made prisoners by the Turkmen. General Kaufmann, though fully appreciating the value of the work done, exhibited but little consideration for the workmen, amongst whom, as far as Mr. Mac Gahan's experience went, Lieutenant Servotsky was one of the most indefatigable. These surveyors have probably decided by this time whether the Oxus, at some former period, flowed into the Caspian. The author describes the soil of Khiva as being exceedingly fertile, yielding crops of wheat, barley, and rice not to be surpassed elsewhere.

M. DE KHANIKOF gave some notice of the results obtained within the last few years by Russian explorers with reference to the old bed of the Oxus. He thought it had clearly been established that the Oxus, or at all events, a branch of it, flowed formerly into the Caspian. This communication had been destroyed by the Government of Khiva, who cut off the Caspian branch by means of five dams, and turned the whole of the river into lake Aral. This was done in order to deprive the Turkmen of a supply of water, and thus to render them dependent for supplies of that indispensable element upon Khiva. Traces of old buildings and gardens had lately been discovered in the old bed of the Oxus.

M. DELMAR MORGAN maintained that the change in the course of the Oxus was due to natural causes, and not to artificial ones, as believed by M. de Khanikof. He referred to the progressive desiccation of a large portion of Central Asia, and to a belt of upheaval, extending from the Black Sea to the Southern Caspian and further East, and thought that causes, such as these, were sufficient to account for certain changes in the hydrographical features of that country.

"Notes on some Roads in Northern Persia and on the Russo-Persian Frontier," by Lieut. W. J. GILL, R.E.

Lieutenant Gill last year accompanied Colonel Valentine Baker on a hurried tour through Northern Persia, and visited several districts, including a portion of the Lower Atrek River. As his account contains data of considerable value, we propose to publish the whole of his paper in our next number, together with the map accompanying it.

"Note on the International Congress of Geographical Sciences to be held at Paris," by M. CHARLES MAUNOIR, Secretary of the French Geographical Society.

The Organization Committee appointed by the Geographical Congress held at Antwerp in 1871, prevailed upon the Council of the French Geographical Society to undertake the management of a second gathering of geographers, which is to take place at Paris, in 1875. The author gives details of the constitution of the various committees, and of the work to be done. In addition to an Honorary Committee, a General Committee and various other business bodies, there will be the following scientific sections:—Mathematical Geography and Surveying Hydrography, Physical Geography, History of Geography and Ethnography, Statistics, Geography in Schools, Geographical Exploration. A provisional board of inquiry has been appointed, to which questions can be referred, each of the scientific groups being required to prepare a series of these. Upon the Honorary Committee all nations are represented, and the countenance of the French Government, and of the municipal authorities has been obtained. Members of the Congress pay a minimum subscription of fifteen francs, and the regulations concerning the proposed exhibition of objects specially interesting to geographers will shortly be published. The Congress will meet on the 31st of March, 1875, and will last, at most, for ten days. The various sections will meet in separate rooms in the mornings, and general meetings will take place in the afternoon. The exhibition will remain open until the 30th of April, and the prizes awarded in accordance with the verdict of an international jury, will be distributed on the closing day of the Congress. Subscribers will be entitled to receive the *Proceedings* of the meeting,

This communication concluded the proceedings of the Section, and Admiral OMMANNEY proposed a vote of thanks for the very efficient manner in which the President had attended to his office. A vote of thanks was likewise voted to the Honorary Secretaries.

The next meeting of the Association will take place at Bristol.

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FRENCH GEOGRAPHICAL SOCIETY.

Meeting of August 7th, 1874.

M. TISSOT, French Minister in Morocco, and the Rabbi Mardokhaï Abi Seroûr were present at the meeting.

The Abbé DURAND read the minutes of the last meeting.

M. CHARLES MAUNOIR having communicated the contents of the correspondence, M. TISSOT, whose large map, showing his itineraries in the north-western portion of Morocco, was exhibited in the room, said that in submitting to the Society the results of his travels in that country, he would only mention a few of the facts which changed our present knowledge of its comparative geography. For instance, he does not agree with M. Vivien de St. Martin as to the identification of Lake Cephisias. Having studied the texts of Scylax and Pliny when standing on the ground they described, M. Tissot's conclusions, as to the ancient geography of the coast-line from El-'Arâïsh to Salâ, are worthy of the greatest attention. On the subject of physical geography, he said that he had not observed any connection between the Sebkha Râs Ed-Doûra, nor between the Loukkos or Lixus and the ocean. He found between the Loukkos and the ocean a barrier of downs, some being of recent and others of ancient quarternarian formation. The site of the ruins of the ancient town of Lixus is found at the foot of the quarternarian downs.

The President, M. DELESSE, on behalf of the Society, begged to thank M. Tissot for the solicitude he had shown in improving our knowledge of the geography of that part of Africa, and also for his generosity towards the Society in offering the results of his travels, which must have been achieved under serious difficulties. The President, also in the name of the Society, through M. DUVEYRIER, wished the Rabbi Mardokhaï Abi Seroûr, who was about to return to Morocco, a successful journey, promising him, at the same time, all possible assistance.

The Marquis de COMPIEGNE gave an account of his own and M. Marche's travels and geographical work on the Ogôwé River, extending over 213 kilometers east of San-Quita, a town 61 kilometers north of Pointe Fétiche The Marquis was still suffering from sore legs, which precluded him from giving more than a few notes from his journal, elucidating his map of the river on the scale of 1:500,000. Before accomplishing his journey he regretted that wars and the receding waters obliged him to return after he had reached the confluence of the Ivindo, a large tributary on the northern bank of the Ogôwé.

On the 9th of January, the day of the death of the King of the Galloi, he began his journey. At Obanga he saw a canal which united the Ogôwé with the Gabûn. The river then runs through forests, where there are large rocks, to which the negroes make fetish. Higher up there were rapids, and rocks level with the water. After four days' journey through a desert country he came to a village of the Bakalé. There he met with the ugly people called the Okota, who are great slave-dealers. He has composed a vocabulary of their language. The King, who was charmed with the presents he received from the Marquis, refused on the following day to allow him to proceed on his journey, but ultimately gave way through

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fear. Travelling on the Ogôwé is very slow, on account of its rocky bottow, 3 miles a day being the average rate of progress.

Before arriving at the country of the Yalimbongo tribe the river seems to descend from a mountain. Here there is abundance of food compared with the country of the Okota. The active volcano of M. Walker, on inspection, proved to be simply a mountain, with *a lake* on its summit. Here the crews of M. de Compiègne almost mutinied.

Eastwards from the Yalimbongo, the Marquis came across the tribe of the Apinji. These Apinji are diminutive, mild men, of business-like habits. They are exposed to the depredations of the Oshieba, who plunder their plantations on the right (north) bank of the river. Here several of the crew deserted, and the remainder refused an increase of pay as an inducement to continue the journey; they, however, repented and started again with the Marquis. Farther on the river is obstructed by rapids, behind which it widens to about a mile, and becomes more navigable. Another Bakalé village was here seen, before the large island of Ochunga; and afterwards the first village of the Okanda tribe was reached, which is situated in a range of mountains.

The Marquis de Compiègne stayed a considerable time in the Okanda country and had frequent intercourse with the Oshieba and Banguin tribes. He describes the Okanda as a fine race of men, who enjoy the reputation of being terrible sorcerers. They cultivate the banana and maize. Their plantations are often plundered by the Oshieba, a kindred tribe of the Fan or Pahuin.

The results of the important work of M M. de Compiégne and Marche, were a worthy conclusion of the business of the session.

H. D.

Bulletin for March.

THIS number opens with a detailed description of the manner in which M. Dupuy de Lôme proposes to shorten and improve communication across the Channel. This he does by building a sort of oval-shaped harbour outside Calais, connected with the shore by a pier, but at a sufficient distance to allow free play for the wash of the tide between. Dover he considers already well provided for the reception of large vessels by its Admiralty Jetty, at the extremity of which there is a depth of 40 feet at low water. Vessels about 400 feet in length will be built to carry the trains bodily across, without the trouble and delay of a double shipment of passengers and goods. There is this to be said in favour of M. de Lôme's plan, that it is evidently practicable, and very inexpensive compared with one or two gigantic schemes which have been recently broached. General Dastugue contributes a concise little article on the meteorology and products of the plateaux and deserts of Western Algeria, a region which, from the extraordinary range of its temperature (59° Fahrenheit in winter) must be classed among those countries where extremes of climate prevail. It is most favoured in regard to its mineral resources, lead, copper, manganese and marble, having been all of them worked with tolerable success. Next follows an account of Chimborazo, Altar, Cotopaxi, and other peaks of the Cordilleras, being a translation of a letter from M. Alphonse Stuebel (who, with Dr. W. Reiss, undertook the ascent of some of the mountains mentioned) to the President of the Republic of Ecuador. A paper on a new method of projecting maps embracing a large extent of country, on what is known as the *gnomonic* projection, shows the northern hemisphere spread over eight triangles, and enters into the mathematical features of this method. But it exhibits manifest peculiarities, not to say distortions. The effect in the map before us is greatly to exaggerate the countries in the southern angles of the triangles, and to really convince one that all these elaborate methods of projecting the details of a sphere on a plain surface are as unsatisfactory as attempts to square the circle. The *Bulletin* closes with a review of an English pamphlet, "The Slave Trade in Africa in 1872," which was written originally in French by M. Berlioux, the Professor of History at the *Lycée* of Lyons.

Bulletin for April.

THE most remarkable article in this month's *Bulletin* is an exhaustive *resumé* on the geographical events and doings of the past year, by the energetic Secretary, M. Maunoir. From it we gain some knowledge of the progress in map-making in France, and in surveys made under the direction of French officers. It appears that three surveyors are engaged on a re-survey of the French coast-line between Italy and Spain. A new survey of the northern part of the estuary of the Gironde was urged by the Chamber of Commerce at Bordeaux, and recently executed by M. Manen. Officers are at work in Algeria and Socoa; and off the west coast of New Caledonia the frigate 'Chambeyron' has examined the passages between the shore and the numerous reefs there. One hundred and thirty new charts have been published during the year under review, in addition to the 3155 already available. The *Carte de la France* has made good progress under the direction of the War Department, and only sixteen sheets, seven of which include Corsica, now remain to be completed. The first batch of sheets of this great undertaking appeared in 1833, and the total number of 274 sheets will probably be finished in two or three years. Like our own Ordnance Survey it has proved a slow though most important undertaking. Two other maps deserve mention: a reduction of the above large scale map on the more convenient scale of 1:320,000, which is making satisfactory progress, and a two-sheet map of Mexico on the scale of 1:3,000,000, accompanied by an explanatory notice.

We have next a review, by M. Charles Grad, of Herr Grisebach's work on the distribution of vegetation over the surface of the globe. The flora of the world is divided by him into twenty-four groups, each of which is subject to peculiar physical conditions. Each of these is considered separately by the author, and he adds some thoughtful remarks on the process by which dissemination is carried on. M. Grad considers the work a valuable contribution to a branch of science which had already received attention at the hands of Humboldt and De Candolle. A suggestive and valuable note by Colonel Yule also finds a place in this month's *bulletin*, in which the gallant Colonel enumerates several points of special interest, worthy of being investigated by the French travellers, Messrs. Fan and Moreau, in their expedition to Burma. The source of the Irawaddy in particular he cites as a mystery well worthy of an attempt to solve.

NOTICE.

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THE

GEOGRAPHICAL MAGAZINE.

OCTOBER, 1874.

THE ARCTIC CAMPAIGN OF 1874.

As season after season passes away without seeing the despatch of an English Arctic Expedition of discovery, the reasons for resuming our proud old position as leaders in Polar enterprise become stronger and more urgent, and the motives which should induce our rulers to comply with the wishes of the nation accumulate in weight and strength. Every year the advances that are made in various branches of science make the ignorance of those facts which would be investigated by an Arctic Expedition more felt, and thus enhance the importance of collecting them. Every year the value of the whaling trade increases, and with it the necessity for examining thoroughly the vast unknown area, and for taking stock of the treasures it contains. Above all, the adventurous spirits of other nations encroach more and more upon the undiscovered region, while England apathetically looks on, and allows her rulers to be guided by the ignorant and unpatriotic herd who mutter *cui bono?* There is no surer sign of a nation's decadence than when the spirit of adventure is overpowered by the indifference and inertness of routine. First the utility of those exploits which form the glory of a nation's history is questioned, gradually all efforts at emulation are abandoned, until at last even the desire to achieve great deeds is deadened. When that time comes for England her days of independence are numbered. But it is far distant. In no former time of our history has our navy contained so large a number of highly educated officers who thirst for the opportunity of distinguishing themselves: and two Arctic exploring ships could with ease be manned by volunteer crews of lieutenants. At no time, too, has there been so warm an interest felt in the question of Arctic discovery by the English public generally, which is shown by the almost unanimous advocacy of the press during the past year.

It is now an important duty, incumbent on the organs of public opinion, to make this feeling known to our rulers. If this is done now, if the country is but represented by the press, an Arctic expedition will be despatched next year; and England will be spared the shame and disgrace of seeing that great work, once peculiarly her own, achieved by others. The subject is now under the favourable consideration of the Prime Minister. The President of the Royal Society, who is not urging others to face dangers which he has not faced, but who has himself encountered the perils and risks of polar navigation, has fully represented the rich and fruitful results of Arctic exploration. The President of the Royal Geographical Society has again explained the geographical importance of such an undertaking, and has once more urged the national benefits to be derived from it. Admiral Sherard Osborn has entered upon all the practical details, and demonstrated the feasibility of Arctic discovery, and the absence of undue risk. The highest authorities on this subject have done their duty by thus placing the question, in all its bearings, before the Government. It remains for the feeling of the English people to receive adequate expression through the press, for our rulers to be made to feel that the appreciation of the uses of voyages of discovery is still as strong as ever; and the year 1875 will see the resumption of the glorious work.

There is much in the record of Arctic enterprise during the present year which gives additional force to the arguments in favour of an expedition. On the one side we see the fishery in Baffin's Bay increasing in value and importance, while the dangers of ice navigation furnish some important lessons. On the other we hear of the great achievements of a handful of brave men to the east of Spitzbergen, which, if anything can, must excite some feeling of shame at our own backwardness.

The Dundee whaling fleet has, during the season of 1874, been remarkably successful:—

'Victor'	170 tons of oil.	'Esquimaux'.	140 tons of oil.
'Camperdown'	190 ,,	'Narwhal'....	80 ,,
'Intrepid'	150 ,,	'Erik'	60 ,,
'Polynia'.....	130 ,,	'Active'	160 ,,
'Ravenscraig'	110 ,,	'Arctic'	185 ,,

One Peterhead whaler, the 'Mazanthien,' also went up Baffin's Bay this year, and has 40 tons. It must be remembered that this is an early report, and that by the end of the season all the ships will probably be full.

The report of the voyage of the 'Arctic,' unfortunately her last voyage, is full of interest. Captain Adams sailed from Dundee, on the 28th of April, with a full complement of fifty-four hands all told, and had a splendid passage to the south-west ice, where, however, no fish were taken by any of the ships during the present season. On the 24th of May the 'Arctic' called in at the Danish settlement of Lievely, in Disco, and reached the land ice of Melville Bay on the 30th of the same month. Here the whalers assembled, but they had not long to wait. This once formidable obstacle, which, in the days of sailing vessels, used to

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cause a detention of weeks and even months, no longer forms a barrier to progress. The whole whaling fleet passed through Melville Bay in two days, and again demonstrated the wonderful improvement which steam has caused in ice navigation. After reaching the "North Water," Captain Adams met with great success, and by the 2nd of July there were twelve heavy fish on board, yielding 150 tons of oil and ten of whalebone. The 'Arctic' then went up Lancaster Sound, and entered Prince Regent's Inlet, where five more whales were taken. Captain Adams then put into Elwyn Inlet, where a large number of white whales were seen in the shoal water, and thirty-two were taken, yielding six tons of oil and two tons of valuable skins. On the 30th of July the 'Arctic' had gone up Regent's Inlet as far as the south point of Cresswell Bay, where she was stopped by ice; and on the 2nd of August she was off Cape Garry, with several other whalers in company. Afterwards, Captain Adams again steamed up the Gulf of Boothia as far as Brentford Bay and Cape Scoresby. The ice was then closing in upon the land, the weather being calm, and the 'Arctic,' 'Intrepid,' and 'Victor,' began to steam down the inlet. The 'Arctic' got as far as Fury Beach, when she was closely beset, in company with the 'Camperdown,' 'Victor,' 'Narwhal,' and 'Intrepid;' and on the 7th a strong gale began to blow from the S.S.E. The ice in which the 'Arctic' was beset drifted until it was brought up on Cape Garry, near the shoal water, which was sounded and laid down on the chart by Captain Markham in 1873. Then the seaward ice began to crush heavily upon the ship, and at 9 she was hove on her beam ends against the grounded pack. It was then discovered that she was making water rapidly, the port bow having been stove in. The water gained rapidly on the pumps, and soon the fires in the engine-room were put out. All hands were then set to work to save clothes and provisions. The ship was now held up merely by the pressure of the ice; and at 6 P.M. she took fire, probably from the galley forward. The flames rapidly spread, and, when they were at their height, the ice opened and the wreck went down stern first. Such has been the end of the good ship 'Arctic'; after a long and exceptionally successful career. She had made eight most remunerative voyages, and had repaid the cost of construction over and over again. In 1873 she made a memorable voyage; returning with the fullest cargo ever known, and with the officers and crew of the rescued 'Polaris.' It was then too that Captain Markham made his voyage for the purpose of acquiring a knowledge of ice navigation, the results of which were given to the world in his *Whaling Cruise to Baffin's Bay*. Thus the 'Arctic' had done right good service in her day. She was lost through one of those casualties which the best seamanship cannot always prevent, but which the use of steam has, in these days, rendered of very rare occurrence.

It should be remembered, that while in other seas such casualties usually involve a terrible loss of life as well as of property, in the Arctic Regions the very ice which causes the destruction of the ship ensures the safety of the crew. Captain Adams and his fifty-four men were exposed to much hardship, passing the night under a heavy storm of rain, until two tents were erected; and on the 8th they were divided among the four ships within reach. The other ships had experienced severe nips, and the crews got provisions and clothes upon the ice.

The 'Victor,' being full, eventually received Captain Adams and all his men on board, and returned to Dundee; where a new and larger 'Arctic' is on the stocks, which will proceed to Baffin's Bay in 1875, under the command of Captain Adams. The 'Polynia,' 'Erik,' and 'Ravenscraig' were still beset when the 'Victor' left Prince Regent's Inlet; but they were further from the shore than the 'Arctic,' and there seems to be little danger of any of them meeting the same fate. But even if all should be lost, the crews will find ample stores of provisions at Fury Beach and at Port Leopold, and the means of passing the winter.

Thus the experiences of the whaling fleet during the present year serve to impress the truth of several lessons in ice navigation. They once more furnish proofs that the old obstacle of the Melville Bay ice has ceased to exist, and that in most seasons steamers can reach the "North Water" with little detention. The loss of the 'Arctic' and the safety of her crew show the extent and nature of the risks to be encountered. With other vessels in company, or, in the case of a single discovery ship, with depôts of provisions judiciously placed, there is no undue danger, even under the most improbable contingency of the total loss of the vessel.

Turning from the incidents of this year's whale fishery to the results of the attempts at Arctic discovery, we hail the success of Lieutenants Weyprecht and Payer and their gallant followers with heartfelt satisfaction. It will be remembered that the Austro-Hungarian Arctic Expedition, under the command of Lieutenant Weyprecht, and consisting of the steamer 'Tegethoff,' left the Elbe in June 1872, and finally sailed from Tromsö Harbour, with that daring and experienced Arctic navigator Captain Carlsen as pilot, on July the 13th. On the 12th of August the 'Tegethoff' was off the coast of Novaya Zemlya, in company with the yacht 'Isbjorn,' commanded by Count Wilczek. The 'Isbjorn' parted company on the 21st August, and returned on the 23rd of August 1872, since which date the 'Tegethoff' had not been heard of, until the welcome news of the safe arrival of her crew at Vardoe in Norway reached us.

The 'Tegethoff' had last been seen off Cape Nassau, the point towards the northern end of Novaya Zemlya where the land trends to the east. On the very day that she parted company with Count Wilczek she was beset, and drifted in the pack-ice during the next fourteen months, or until October 1873; first, until February 1873, in a north-easterly direction to 73° E. longitude, and then north-west. At first calms prevailed, but heavy falls of snow, combined with great cold, rendered the surrounding ice impenetrable. Violent storms in September broke up the ice, without, however, liberating the 'Tegethoff' from its critical position in the midst of a vast floe, drifting about at the mercy of the winds. The pressure of the ice frequently threatened destruction to the vessel, which had been up-lifted to a height of 7 feet, and every attempt to liberate her, by blasting or sawing through the ice, proved abortive. On the 31st of August 1873, a hilly country was discovered, in sight of which the 'Tegethoff' was drifted about until the beginning of October, when the floe was driven upon the land, where it froze fast. In this position, in 79° 51′ N. and 59° E., the expedi-

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tion wintered in 1873-74. Snow huts were built upon the ice, and a series of astronomical, meteorological, and magnetical observations was taken, the latter, however, being interfered with by the frequency of unusually intense auroræ borealis. When Lieutenants Payer and Weyprecht made their adventurous voyage in 1871, in the sea between Spitzbergen and Novaya Zemlya, they encountered unmistakeable evidence of the existence of land to the northward, between the meridians of 28° and 36° E.; when in latitude 77° 17′ N. The depth of the sea was decreasing, there were numerous bear tracks on the ice, and the fogs were thick and incessant. The same signs were encountered further east, in 78° 41′ N. This land has now been discovered. It is probably a prolongation of the Spitzbergen archipelago to the eastward, continuous with the high land discovered by the Dutch in 1707, and known as Gillis Land. Further north the sea increases in depth to a thousand fathoms, so that the new land probably consists of islands extending from Gillis Land to the east and north.

During March and April 1874, Lieutenant Payer conducted sledge expeditions along the newly discovered land to the north and west. One of them reached the parallel of 82° 51′ N., and land was seen extending as far as 83° N. The newly-discovered land is dreary in the extreme. Many bears were killed, but no other quadrupeds were met with, and the flora is exceedingly poor. A large portion of the land is covered by immense glaciers. The conical peaks rising above the plateau attain a height of 5000 feet. The prevailing rock is dolomite. The newly-discovered land has been ascertained to extend through 15 degrees of longitude, but is probably of much greater extent, as its termination could not be seen from the summits of the mountains. It has received the name of Franz Joseph Land.

On the 20th of May they set out on their return journey with three boat-sledges. Their progress was exceedingly slow. On the 3rd of June they were still within 7 miles of the abandoned vessel, and finding their progress barred by floating ice they returned for a fourth boat. A second start was made on the 17th of June, but owing to southerly winds no progress could be made, and the 15th of July still found them within 7 miles of the 'Tegethoff.' Northerly winds set in at length, and open water was finally met with on the 15th of August in 78° 40′ N., 61° E. The sledges were then abandoned for the boats. Cape Nassau, on Novaya Zemlya, was sighted three days afterwards, and sailing along the coast of that island in a southerly direction, our adventurous travellers fell in with a Russian schooner, in Pukhova Bay, on the 24th, and they reached Vardoe, in Norway, on the 3rd of September. At Hammerfest the Austrian navigators met the English schooner 'Diana,' which was about to search for them. Count Wilczek has generously undertaken to pay the wages and other expenses which have accrued in consequence of the prolonged absence of the expedition, amounting to about 2000*l*. The health of the explorers continued excellent during the whole time, only one man having died, an engineer named Krisch, who succumbed to a pulmonary complaint, in March 1874, the seeds of which had been sown long before he joined the expedition.

The complete success of the Austrian Arctic Expedition is most encouraging. It furnishes one more proof of the healthiness of the Arctic climate, of the absence of undue risk even when the ship has to be abandoned, and of the important results to be secured by any expedition, when led by an experienced and resolute commander. It is also extremely gratifying to find that Lieutenant Payer, by studying the instructions furnished to him by Sir Leopold McClintock, has achieved great success in sledge travelling. Following the impulse of a generous nature, the very first thing that Payer did, after landing in Norway, was to send the following telegram to McClintock:—"In following your advice, endless advantage. Pray accept thanks. Discovery of land 200 miles north of Novaya Zemlya. Information follows."

The reception of the members of the expedition throughout Norway was most enthusiastic. The King invited them by telegram to visit Stockholm on their journey home, but circumstances apparently did not admit of this, for we hear of Payer's and Weyprecht's arrival at Hamburg, where they are being entertained as the guests of the Geographical Society.

Lieutenants Payer and Weyprecht will deservedly receive a hearty welcome from their own sovereign and countrymen, and the cordial congratulations of all geographers. They have, by dint of perseverance, intrepidity, and the most careful study, made a great and memorable discovery, of which the Austro-Hungarian nation may well be proud. If, as we confidently anticipate, their success excites some feeling of shame in this country, at the disgrace which is being brought upon it by the inertness of our Government, they will also have conferred a benefit upon Old England, which those who love her will long remember with gratitude.

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TRAVELS IN NORTHERN PERSIA.*

THE writer of these notes last year accompanied Colonel Valentine Baker in a hurried tour through Northern Persia, with the idea of roughly sketching some of the ground, and of making as good a map as circumstances would permit of the country visited.

The map has no pretensions to extreme accuracy. No other means for measuring distances were available than a judgment of the pace of a horse; and often on dark nights direction was judged only from the stars. Observations were taken when time permitted, but I regret that, owing to the roughness of the country, watches and chronometers were alike untrustworthy, and the only result of the observations was the proof of this. The only observations that can be considered to have given useful results, were those for latitude by meridian altitudes. The heights of mountains, &c., were all taken by two, and sometimes three, aneroid barometers, corrected when possible by Casella's hypsometer, a most useful and convenient apparatus for travellers. The roughness of the work can be estimated from the fact that three barometers, always carried on my own person, were so much shaken as to differ by as much as an inch. The corrections that I was able to make with the hypsometer were, however, quite sufficient to give me confidence that the heights I have laid down are fairly accurate.

With regard to the nomenclature, I should wish to make a few remarks before passing on to the principal part of this paper. It is extremely difficult to arrive at the correct nomenclature, as the ordinary Persian is very careless in his pronunciation of names. I have often had a name repeated to me six or seven times, each time with a different sound. Again, Europeans have such different systems of representing the same Oriental sound, and many do not even agree in endeavouring to represent the sound, but try to translate the name by translating the letters. It is greatly to be wished that English travellers, at all events, could be induced to adopt some recognized system of orthography. The name of the Holy City of Meshhed is a notable example of the variety of systems. I have seen it spelt Mashad, Mashed, Meshed, Mushed, and Mashhad. I have endeavoured myself to write the names in such a way that an English person reading them would, as nearly as possible, approximate to the sound.

Another difficulty a traveller in Persia has to encounter in making geographical researches is that in any district all geographical features bear the name of the district, so that a river passing through half a dozen districts will have half a dozen different names.

Again, the inveterate habit of lying throws great obstacles in the way of obtaining geographical knowledge. The traveller may often spend an hour in conversation, and flatter himself that he has obtained a great mass of useful information, only to find next day that the whole of it is a tissue of falsehoods, fabricated in all probability to affect in some way the movements of the traveller, to benefit the mendacious speaker, or save him some trouble.

The northern parts of Persia are covered with great masses of mountains, and on those portions immediately on the borders of the Caspian Sea, these mountains are only separated from one another by narrow valleys, sometimes mere gorges; but as we get eastward there is a considerable change, as the mountains there run in long parallel ridges, with wonderful regularity, in a north-west and south-east direction, and are often separated by wide valleys, generally very flat and level.

The city of Teherān is situated on the edge of a vast plateau, about 4000 feet above the level of the sea. About 10 miles to the north of the city is the great range of mountains known as El Burz, one of whose peaks, immediately above Teherān, is 12,000 feet high. These mountains are remarkably bold, with very steep sides, the roads through them winding up the steepest zigzag, and it is no uncommon thing to stand on an elevation of some 8000 feet, with the plain apparently directly underneath, and, in reality, often not more than 5 or 6 miles in a horizontal line. These passes can, of course, only be used in the summer; in the winter they are left to themselves, in all the gloomy desolation of fog, ice, and snow; and even in the month of August most of the mountain roads are impassable for anything but the most sure-footed ponies or mules.

Immediately at the foot of these magnificent mountains is a cluster of villages, which, from their superior climate, have been adopted by the European missions as summer residences, when the close and intense heat of Teherān is almost unbearable. These villages are from 800 to 1000 feet higher than the city, and although the heat during the day is very great, the evenings are comparatively cool.

An excellent carriage road has been made from Teherān to Gulhek; this village is the absolute property of the British Government, and the natives who live there are free from all taxation by the Persians. The sides of the roads are planted with trees and flowers, and in the evenings a good many carriages, belonging to Europeans and Persians, may be seen here.

From Gulhek into the mountains, the road almost immediately ascends a steep spur, the crest of which is 10,000 feet high. Here, on the 13th of July, we found snow in the crevices of the rocks and on the edge of the streams. The mountains generally are very bare, but here and there there is a little scanty vegetation. I noticed a wild rhododendron at an altitude of 10,000 feet. From the crest of this spur the road still ascends a steep path, and passes over a point 12,200 feet high. There is a peak near which rises 400 feet higher, and this is the most elevated point in this grand mountain.

The tops of these mountains are covered with loose stones. In the winter the cold is of course intense at these immense altitudes, the water in the numerous crevices freezes, and the expansion bursts the rock into innumerable fragments. In these solitudes where down below lies the vast and arid plain, stretching towards the horizon, invisible in the dim haze of the desert, is the home of the ibex and mouflon; and often when no other sound is to be heard but the scream of an eagle astonished at the unwonted sight of a human being, the metallic ring of the loose stones rolling down the mountain side attracts the sportsman's notice to a herd of these animals, dashing up what would appear an almost impossible precipice.

A little below the crest, at an altitude of 11,819 feet, we pitched our first camp. From here the road

* Read at the Geographical Section of the British Association at Belfast, August 1874.

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Map of Portions of PERSIA AND TURKISTAN,

SHEWING THE ROUTES OF

Col. V. Baker and Lieut. W. J. Gill.

Scale 1:2,000,000.

0 10 20 30 40 50 60 Stat. Miles.

Altitudes in Feet. Those determined by Lieut. Gill underlined.

---------- Gill's Route.

CASPIAN SEA

(85 Ft. below the Ocean Level.)

Ogurchinski I. · B. Kukhar Mama · Kara dashly Pen.a · Shairdy Pool · Yegenaji Pool · Eren L. · Bugdaili · Berkeli · Gyamyajik · Kochef · Tagan klych · Chikishlar · Hasan kuli · Gumush Tepe · Gurgen R. · Ashur Is Pz. · Miyan-kale Pz. · Ferabad · Astrabad B. · Ashraf · Meshhediser · Ferikenar · Karatepe · Pulirika · Barfrush · Sari · Amol · Aliabad · Mehdunisir · Shergao · Izeddeh · Ak Mahalle · Derinjan · Shahzade · Kharu · Demavend · Niah · Naua · Ask · Abbasabad · Gulhek · Tehran · Amenabad · Kenaghird · Aliabad · Kishlak · Aradan · Deh Nimmuk · Abdalabad · Lazgerd · Semnan · Shahmirabad · Damghan · Dauletabad · Aseran · Rudbar · Amrevan · Ahiyurn · Tabaristan · Elburz Mts. · Mazandaran · Irak · Kuren Dagh · Kyzyl Arvat · Niaz · Karry kala · Koj · Sau · Kyzyl Cheshme · Bamy · Baurma · Vila koshluk P. · Kara Chuk · Arkman · Karagan · Karaji · Karyz · Yangi kala · Bab Arab · Kopet Dagh · Ashkha · Alaka Zayak · Kipchak · Mirava · Askabad · Markoch · Turkmen · Tekke · Tamashik · Gauars · Babadurma · Annau · Kalkachinar · Buguashik · Abivord · Khasrau · Dargana · Baurt · Karakhan · Chardi · Durunga wasad · Durunga pai · Durunga bak · Shikwanlu · Kilhatha · Firoza · Nohandan · Muhamedabad · Deregez · Chapishli · Kud Var · Bujikala · Shimina · Incha Pass · Incha Wazan · Mollamamuk · Itabli · Buchan · Kabushan · Faizabad · Farruch · Jafirabad · Samandak · Kelat · Lam · Idalik · Wardeh · Haukisir · Dighi Nazar · Saidan · Kanaran · Kardeh · Andarik · Rezun · Tuz · Kishmeti · Turgabi · Gulistan · Mesh-hed · Turuk · Sarakhs · Khanluk · Mirab Jeghir · Derwa · Kadanga · Sherifabad · Meghriz · Robat Sefid · Asadabad · Kademdarabad · Godar i Baidar · Kant i bala · Ala Dagh · Binalud Kuh · Khorasan · Juvein · Dagh · Shavar Kuh · Tajez · Sharud · Bostam · Meaez · Gilan · Savanj · Riabad · Jajerm · Jafirabad · Sanghar · Kafir kala · Zekhun · Mianabad · Maden · Sultanabad · Sabzevar · Husenabad · Safranlu · Shoriab · Nishapur · Rivod · Mihr · Sutkar · Mezinan · Romanabad · Abbasabad · Miandesht · Meimeh · Pedesht · Ameyin · Nazirabad · Mihan · Khaaf · Khandudi · Tulabrishim · Abadan · Tourone · Deruna · Aliabad · Turshiz · Asgani · Turbet i Haidari · Abdulabad · Bengan · Kumish Kuh · Sebe · Kalushaluk · Desht i Kuvir · Salt Steppe · Chat · Bairam Oliun · Yaqly Oliun · Udei · Bayat khaji · Gekcha Dagh · Goklan · Kur Dagh · Songu Dagh · Said Deirak Gumbet · Sumbar · Bair · Chandyr · Chakte Oliun · Akh Yalla Oliun · Gudri Oliun · Karashi · Atabai · Jafarbai · Kara Sui · Kyzyl Alan · Jorjan · Nodeh · Pisertik · Farsian · Finderisk · Derala · Alchala · Sengir · Kara Mihale · Astrabad · Husenabad · Alexan · Kanache · Kuzluk · Sandukl · Gez D. · Sauer · Tang Shemshir Bar · Radgan · Tauch · Cheshmehad · Chahardeh · Kalateh · Cheshme Ali · Bonabad · Kadarabad · Tarki · Kalatakhan · Dehmollah · Kalatmollah · Sultanabad · Mahmudabad · Astani · Sakardeh · Agira · Gushe · Atula · Seidabad · Ghildun · Aliabad · Zirab · Pul i Sahid · Taleh · Derbendisar · Shemshuk · Lavasan · Shehristanik Pass · 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British Statute Miles. 0 5 10 15

Ovatak Kilati · Hajie Kilati · Ovadkelati · Inplak · Aspinagh · R. Atrek · Hichmagee · Pishkala · Jangal Ali · Kekana · Bujot · Najef · Simalghan · Dekbend · Herich · Chola · Shahabad · Chechalu · Koshkabad · Kardchu · Bakchi · Sariwan · Bujnurd · Kilatha · Kaladarbar · Balgaran · Karakhanbanda · Ali Baghdamal · Sisan · Aman

E. G. Ravenstein Delt.

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at once descends by a steep zigzag into a valley, in which, during the summer, large herds of sheep and goats are fed on the somewhat scanty vegetation. Lower down, at an elevation of 8770 feet, is a small tank around which during the summer a few nomads pitch their miserable black tents; and from here a stream, in which, a little lower down, are some excellent trout, runs into a narrow and fertile valley.

The character of all the valleys in these districts is the same—beautiful springs of clear and cold water bursting from the rocks. Rich barley fields, watered by innumerable miniature canals; at every 2 or 3 miles a small village, the flat-roofed houses of which are hidden in ash, poplar, and walnut trees; and rising abruptly from these valleys are the bare and rugged mountains on which there is scarcely a blade of grass.

A little below the village of Shehristanik the stream breaks through a gorge, and, passing within 20 miles of Teherān, is lost in the desert. This term, "lost in the desert," is however scarcely correct, because every drop of water being used for irrigation, it can hardly be said to be lost. The Persians are very clever at their irrigation works; the water is often conducted long distances, and is turned first on to one field, then on to another, as it is required.

From a point not far from this an excellent road into the Mazanderān has been made—one which is in every way a remarkable contrast to the wretched mule-tracks which generally are the only apology for a road.

The character of the Persians is exemplified in their engineering works in a most striking manner. The governors of provinces are very fond of making a good carriage road when possible, and it is by no means an uncommon event to suddenly arrive on one of a most ambitious description. This will be continued as long as no difficulty presents itself, but directly the smallest engineering skill is required, the unconquerable idleness and want of energy of the people become apparent: the work is abandoned, and the mule-track, where often the bât animals have to be unloaded, is left until the difficulty is passed, and then, when in fact the road is comparatively little wanted, the works are again commenced. Their system of irrigation is of course to them an absolute necessity; without it they would starve. Were good roads equally a matter of life and death, no doubt the difficulties would be overcome.

At Shimshak is a coal-mine, whence coal is taken into Teherān. Within 2 miles of this village is an unworked seam of surface coal; the direction of the strike is E.S.E. The cost of transport is, however, so great, that although it may be had for the trouble of digging it, it costs at Teherān somewhere between 2*l.* and 3*l.* a ton.

A little further to the east is the river Jarjerud, the valley of which is at this point from 1 to 1½ mile in breadth, and is extremely fertile. Following up one of the branches of the Jarjerud, the watershed between the Caspian and the Teherān plain is reached at a point about 10,000 feet above the level of the sea. Immediately after this crest is passed, a torrent descends between cliffs, and the valley of the Lar is reached. This valley is of a totally different character to those on the other side of the watershed. The plain is about 1½ mile in width, through which at this season of the year (July) the river flows at a gentle pace, but where in the early spring the water must pour down with tremendous violence, a roaring flood, which from the appearance of the banks must be a quarter of a mile broad. The valley here is dreary in the extreme, not a tree or shrub will grow, and no corn. There is, however, a good deal of a kind of rough grass, on which large flocks of sheep and goats are fed, the owners living in black tents. About the month of September they migrate to the villages and towns in the Mazanderān. The whole of this valley is during the winter buried in snow and ice.

One of the sources of the river Lar is most remarkable. An enormous mass of clear and icy cold water bursts from a crevice in the rock. This mass of water is in itself sufficient to make a stream of some size. This river is full of the most delicious trout, which run up to three pounds in weight, and the English at Teherān almost always spend a portion of the summer fly-fishing. The natives also succeed in capturing a large number of fish near the sources, where the river is only a narrow and shallow stream, but they do so by damming up the deeper channels and forcing the fish, who are working their way up stream, to try a passage in the shallow channels, and the natives stand in the water, and strike the fish with sticks as they dart past.

The first stream that runs into the Lar is called the Ab-i Safid, from its whiteness, which is evidence of a large mass of chalk somewhere amongst the mountains.

The next tributary is called the Demavend River, and on the north of the Lar at this part the whole ground is covered with spurs from the magnificent mountain of Demavend, whose summit is estimated at from 18,000 to 20,000 feet.*

Beyond this there is a little cultivation, and a few wild pomegranates appear. A little below there is a good bridge, with a road leading to the south to the villages of Demavend and Bumehan. Here also is a little open ground, and the slopes of the valleys are well cultivated. A little below this the river again enters a narrow gorge between perpendicular precipices 200 to 300 feet high; the path is obliged to pass above the precipices.

At Ask, a very large village, are numerous sulphur springs; there is also a great deal of iron in the water. Near this the valley is very fertile with trees and cornfields, and is thickly populated. There are high table-lands on each side, some of them 2 or 3 miles square, perfectly flat, elevated above the river about 1000 feet, and separated from it by steep precipices. These table-lands have evidently been at one time a valley similar to that of the Upper Lar, through which the river must have flown at a gentle pace.

A little way up one of these tributaries, the Ab-i Garma is reached, a hot spring that bursts from the hill side in a beautiful clear stream, the temperature of which is about 160° Fahrenheit. This warm spring is slightly effervescent; it contains apparently a good deal of sulphur, and has a very unpleasant odour. The water runs down about 100 yards into a dirty pool of black mud in which the natives delight. They come from immense distances to bathe here, and sit for hours in the black mud, smearing themselves all over with it. They will do this even if they are in perfect health. There is also here an artificial bath,

* According to Ivashchintsef's trigonometrical measurement, 18,454 feet.

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and on one of the plateaus before referred to are extensive remains of the old Roman baths. Below this the river Lar becomes a rapid and turbid torrent, and at the point where the river bends from the east to the north, there is a great deal of cultivation, with fine trees and vineyards; but immediately below this all cultivation again disappears, and with the exception of a few stunted willows, close to the water's edge, there is scarcely a leaf.

Enormous fragments, torn from the mountains by the winter's frosts, strew the ground in all directions, and the scenery has a savage grandeur peculiarly its own. Soon after the mountains again close in, and a little lower down precipices 300 to 400 feet high run sheer down to the edge of the water; and the road, which is cut out of the rock in such a manner that in two or three places a rider has to stoop and mules have to be unladen, almost hangs over the stream.

The village of Kharu is a little oasis in the middle of this gloomy scene. There is a small open space, and the houses at this time of year (18th August) are hidden in mulberry and walnut trees in their richest foliage, but immediately below the valley again narrows. Here in the sides of the rocks on both sides holes have been excavated as temporary resting-places for travellers, as it is impossible to traverse these roads on a dark night.

The scenery does not vary until near the village of Shahzade, when trees begin to appear—first a few beech trees in the valley, then on the hills a great number of small *lignum vitæ*. Soon after, a hill, well clothed with foliage, appears. At Shahzade itself the hills are well covered with trees, the valley widens, and at about 7 miles lower down the forest commences, every hill side being clothed to its summit with trees. The valley continues to open out, the hills on each side become lower, and the river here runs through a park-like country where the grass is of the richest green and trees in full foliage.

The forest extends to within about 5 miles of Amol, where the plain is covered with a jungle of high grass, common bracken, blackberry bushes, and wild pomegranates. There is barley cultivation in patches, but not so much as might be expected from the richness of the soil; the villages are surrounded with magnificent trees, and every here and there are clumps of the most splendid beeches, oaks, and walnuts.

Amol at this season of the year is quite empty; and the deserted bazaars, with all the shops shut up, and locked with the primitive padlocks in use here, presented a curious scene. The inhabitants all go to the hills during the summer to feed their flocks, and do not return until the snow drives them down.

The river at Amol is very small even now after a good deal of rain, because nearly the whole of it has been diverted into irrigation channels, and used for the purpose of cultivation. There are reputed to be salmon in this river, and we came down here on purpose to see them; but I do not believe in their existence. They catch large fish of some sort in the winter and dry them; I don't exactly know what the fish are, but certainly not of the salmon tribe.

From Amol to Barfrush the country is the same in appearance, and for the first 3 miles all marsh, after which, although cut up by many streams, it is comparatively dry.

About a mile beyond Barfrush, the road to Mehdunisir enters a beautiful forest of beeches, walnuts, and oaks, with undergrowth of pomegranates, vines, brambles, and bracken fern, so dense that not even a dog can penetrate it. The road itself is a mere path, through which laden mules can scarcely pass.

Mehdunisir is on a stream; the village is on a small open space, with a little cultivation, surrounded by the same impenetrable forest which extends another 2 miles to the north, after which the country opens out, and there is a good deal of cultivation. Here we struck the Chapard road from Sari to Teherān. From Haftan to Shergao the whole country is covered with the most magnificent forests of planes, beeches, oaks, and walnuts, and between Shergao and Zirāb are immense box trees, sometimes as thick as a man's waist, and shooting up as straight as the mast of a ship, but they appear in large numbers in this particular spot only.

The forest above Zirāb is very different: it is composed of the same magnificent trees with the addition of teak trees; but there is absolutely no undergrowth. The road is good, though very heavy after rain, and ascends gradually to a height of 4300 feet. Here a descent commences, and immediately after crossing the ridge the forest completely changes in appearance. The trees are in patches only on the hills, between which are open slopes of green grass. A valley, enclosed by small hills, opens out, which is very fertile, and, where not covered with rich barley fields, there is excellent turf, which affords grazing ground for large flocks of sheep and cattle. The valley is thickly populated, and there are villages at almost every mile in any direction.

Beyond Ali Abad the forest becomes more dense for a few miles, and the road is very bad after rain, being through a very heavy, sticky clay. A little beyond this the forest begins to disappear; the sides of the hills have trees only in patches, between which are green slopes, and sometimes bare rock; and in the valleys where water can be obtained every available foot is used for rice cultivation.

Beyond Atula are scarcely any trees but a few stunted oaks; and, after crossing another summit, there is nothing but the bare rock. There is a long, undulating plateau, nearly 7000 feet high, about 7 or 8 miles across, in which is the line dividing the water basin of the Caspian from the streams that flow into the desert.

There is a spring of good water about 3 miles from Sakardeh, but there is besides this no good water till Cheshmeh Ali is reached. A little before this there is a marsh about 2 miles long, with long reeds, in which we found a few duck and other aquatic birds.

Cheshmeh Ali is a very fine village where there is a fort, and from here a beautiful stream of clear water joins the hitherto almost stagnant rivulet. Here also the Shah has a palace very prettily situated, with a large pond of clear water.

Below Bawabad the river leaves the mountains and enters the desert, which stretches from here 400 miles to the south. It runs as far as the village of Tark, where the last drop is used for irrigation.

Across the desert detached mountains can be seen about 50 or 60 miles distant, apparently 5000 or 6000 feet above the plain. The road from here to Shahrud is excellent, along a level, sandy plain, dotted with towers, which have been built as a protection against the Turkomen, and all the villages are surrounded with walls for the same reason.

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From Shahrud to Bedesht, over a level, sandy plain, and on to Ameyun, which lies amongst some low hills, and until Meiomid is reached, there is no cultivation. There are mountains on the right, and on the left can still be seen the continuation of the range which encloses the Bostam plain on the north.

Meiomid is a large and important place with many gardens, good fruit and vegetables, and a fine caravanserai. This village is situated at the foot of a pointed and precipitous rock, of which Ferrier observes, that "the inhabitants have never ascended, believing it to be the abode of evil genii." The inhabitants are less superstitious in the present day, but probably make as few excursions to the top as they did before.

The road to Miāni Desht passes over the same dead waste. In one point there are a few low sandhills which is considered a dangerous spot on account of the cover any stray Turkomen could find.

At Miāni Desht is no village, only an old caravanserai, built by Shah Abbas, falling into ruins, and a very magnificent new one, to contain about 1,000 travellers. This is loopholed and flanked with towers, and it will be, when finished, a really strong fortress. The water here is filthy. With reference to the old caravanserai, said to have been built by Shah Abbas, it is worthy of remark that the Persians ascribe all public works to Shah Abbas, and if he constructed only half of those he is credited with, he would have deserved well of any country, much more of a country like Persia, whose rulers generally think of nothing but their own pockets.

From Miāni Desht the road passes through another range of sandhills, and then emerges on to the plain which from here to Abbas Abad is much cut up by water courses.

Abbas Abad is a small village with a fort, and a good caravanserai, and contains about 100 inhabitants. The water is very good and plentiful. This is one of the villages in which Shah Abbas the Great settled the Georgians. Ferrier says of them that in his time they still retained the Georgian type; intermarriage with Persians has since then completely eradicated this.

At about 8 miles from Abbas Abad on the road to Mezinan is Pulabrashim, over a now dry watercourse. It is said that the Turkomen never cross the bridge, and once over it the travellers and pilgrims consider themselves safe. About 4 miles beyond Pulabrashim is a fort and caravanserai. The road to Mezinan passes through extensive ruins, evidences of former grandeur and the wealth of the place. At Mezinan is an old caravanserai, built by a son of Haroun Al Rashid, and destroyed by Tamerlane, on which are Cufic inscriptions.

From Mezinan to Mihr, across an arid plain, without cultivation, except a little round the village of Sutkar. Mihr is a village of considerable size, with five plane-trees in one of the streets; the water is good and plentiful, but as the stream runs over a porous bed, the inhabitants have a singular custom of throwing a quantity of mud into it about 7 miles up; this they say prevents the bed absorbing as much as it otherwise would. Whatever may be the value of this practice, it is exceedingly annoying to the thirsty traveller. In the mountains to the north of Mihr there are extensive copper mines.

Before reaching Sabzevar an old Arab minaret with Cufic inscription stands by itself, the last link between the present and the past.

Sabzevar stands amongst a great deal of cultivation, and is surrounded by a wall with towers and a ditch, and on the north side of it a citadel.

Maden is composed of two thriving villages, Kala-i-poi, Kala-i-bala, which mean the upper village and the lower village, with good gardens, and fair water, which is very plentiful; but the women always wash their clothes at the head of the stream, which is a somewhat unpleasant practice. About a mile from here are the celebrated turquoise mines.

Derud, a beautiful village, with gardens and fine trees, and a tumbling stream of clear water flowing over a rocky bed. The road follows the valley for some distance, and the trees extend for about 3 or 4 miles above Derud. The difference of climate on the two sides of the mountains is very remarkable—at Derud the day was hot and sultry, while on the north side of the mountain, at almost the same elevation as Derud, the sun even in the middle of the day was very welcome. The mountain on the north side is very bare until about 2000 feet from the summit, where small trees begin to appear in the valley on the edge of the stream. It was here that we had been promised trees so high that if we should attempt to look at the tops our hats would fall off. Numbers of little fortresses are perched on the hills; they are all of mud, but their positions are well chosen.

From the summit of this mountain which is reached by what is, for Persia, a very fair road, the road descends to the great and Holy City of Meshhed, the shrine of Imam Reza; next to Mecca, the most sacred spot for a Shiah Mussulman. On a bush from which the first sight of the city is obtained, hang numerous little bits of rag, which the devout always place here when they first see the goal of their ambition. Beyond its holiness, Meshhed has few attractions or peculiarities; it is with its gardens about 12 miles in circumference, situated in a perfectly flat plain, well cultivated, with plenty of water.

Between Kardeh and Wardeh the road follows a stream amongst some high mountains, which end in tremendous cliffs. The valley is in many places only a few yards wide. The only vegetation is the wild barberry, which grows in great quantities, and a few wild briars.

At Kardeh I saw the inhabitants making a syrup from grapes. They boil the grapes in great vats with a fire underneath. The building altogether is very like a kiln, and the fire is lighted from the outside. The grapes are simply boiled in these cauldrons, and a kind of syrup is made which is too sweet for the taste of most Englishmen.

Kilāt is one of the most remarkable places in the world: it is a natural fortress, and if anything in the world can be impregnable it is certainly Kilāt. The description of the happy valley in the romance of Rasselas might almost be taken for it. It is a large valley, surrounded on all sides by mountains absolutely inaccessible from the outside. At the tops of these mountains can be seen perpendicular cliffs some 200 or 300 feet high.

There are five entrances to the valley through narrow gorges only 2 or 3 yards wide, the cliffs on each side towering up like walls. The valley, besides a stream that runs through it, is plentifully

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supplied with water from springs, and there must be many minor streams that run down from the mountains. There are several villages in this valley. The inhabitants have their herds, and cultivate their corn all in the valley, and consequently they could not be starved out, as they always live on what is grown inside, and there is plenty of pasture for their flocks. This valley appears, however, not to be very healthy: it is probably too much confined.

From Kilât to Idalik the road winds amongst hills with mountains on the left from 7000 to 10,000 feet high. There is scarcely a level mile on this road, and from the summits of the hills the plain of the Attock can be seen stretching to the north.

Before reaching Chepishli, we crossed a fine stream called the Rudvar, running through a wide valley with plenty of grass, and here the Turkomen come to feed their horses. It is considered a dangerous place on that account, and there is not a village nor any cultivation. The greater part of our escort deserted us before we reached this valley, and we marched across it with only about half a dozen soldiers. When next we paid a visit to it, in company with the Governor of Deregez, our escort was 700.

The Deregez district, which from its position, jutting out into the Turkoman country, should be the least prosperous in Persia, is by wise government the only country through which we passed in our whole journey where prosperity is evident. The moment we entered the Deregez district the country seemed to bear on its face the evidences of comfort. The peasants looked happy, instead of bearing on their countenances that look of oppression which is almost invariably to be seen. The villages and bazaars were scrupulously clean, presenting a marked contrast to those in other districts. Elia Khan is the name of the governor, and he and his fathers have ruled this district for 200 years.

The relations maintained between the Persians and Turkomen on the frontier are very extraordinary. Elia Khan appears to be on most friendly terms with the Turkomen, yet he knows that if he relaxed his watchfulness for one day they would attack his country. Some years ago, owing to an intrigue, he was deposed from his governorship, and some one of the ordinary Persian stamp, a miserable creature, whose sole idea was filling his own pockets, was appointed governor. He very soon became a prey to the Turkomen; the province was overrun, and whole villages destroyed. Persians were taken by hundreds and sold into slavery; and so critical did the position of affairs become that the Shah was obliged to reinstate Elia Khan, because he found that he was the only man who could by any possibility remit money to him; this of course being the one and only object in appointing governors; and nothing could be said more creditable to any man than that, in the midst of this mass of corruption, one should be found who had a soul above the miserable meannesses, the tyrannical oppression, and greed of gain, by means, however abominable, which are the distinguishing features of Persian administrators.

Immediately on the re-accession of Elia Khan, the Turkoman forays ceased, and Deregez is, as I have shown, the most thriving of the Persian provinces. Yet this is not attained without constant watchfulness; sentries are always on the alert, and Elia Khan is always ready for an attack: but, notwithstanding this, the Turkomen and Persians are upon most friendly terms, and traders pass between the two countries, and Elia Khan could at any moment get 1000 Turkomen to fight for him.

When we were in Muhamedabad, Elia Khan had a quarrel with the Amîr of Khorasan, who is his chief. Elia Khan prevailed upon the Governor of Kuchan to assist him, but the Governor of Bujnurd, another neighbour, refused. The Amîr marched to Kilât from Meshhed, and then they made peace; Elia Khan, in all probability, paying a very handsome peace-offering. The Amîr was also undoubtedly influenced by the fear of the assistance Elia Khan would have received from the Turkomen; indeed he informed us that had the Amîr marched beyond Kilât, he would have sent 1000 Turkomen against him. After this, however, a regular feud was established between the Governors of Deregez and Kuchan on one side, and the Governor of Bujnurd on the other; and when we were in Bujnurd it was evident that there might be a fight at any moment. This animosity was so intense that it penetrated to every class of society, and no man in Bujnurd would have any communication with those of Kuchan or Deregez.

We left Shirwan, a Kuchan town, with a fair escort, and in ignorance of this feud marched to Sisou, on the Atrek, the first of the Bujnurd villages; but when we arrived we were not admitted, and although we had the order of the Prince President of Persia (who acted as the representative of the Shah during his European tour), recommending us to the care of all whom we might meet, we could gain no civility of any kind from the Bujnurd people, nor could we hope to get supplies. We soon, however, discovered the reason, and dismissed our escort. When they were well out of sight, we met with the usual courtesies from the headman of the village, who had previously declared that he respected neither God nor man, nor the Shah, but that the Governor of Bujnurd was his father, his mother, his all in all.

From Muhamedabad to Durunga, the road follows the river, which flows through a most fertile valley, with numerous villages, surrounded by very large gardens, and a good deal of cultivation.

In Nohandân is an old fort, of a construction which must have been common at one time in these parts of Persia. An artificial mound of earth, 20 feet high, and 100 yards in diameter, was raised, and on this a fort was built. Remains of these constructions we saw near Shahrud, and in several other places on the road. Nohandân is surrounded by particularly fine gardens. Here and at Kuchan there are immense vineyards.

The Kuchan valley is very fertile, well watered, and extensively cultivated. From Kuchan to Shirwan are numerous villages. Shirwan is enclosed in walls and towers, and beyond this the cultivation diminishes.

Beyond Reizabad the road leaves the Atrek, and follows its affluent the Babaman through a narrow gorge to Aman, where the valley opens out into an extensive plain, in which is situated the town of Bujnurd, surrounded by walls and towers. Between Bujnurd and the Atrek is a ridge of hills, almost mountains. The Atrek north of Bujnurd runs through a valley about 10 miles wide. On the north it is bounded by a range of hills; these run into the main chain of mountains bordering the Atrek, and in some places these latter must be 10,000 feet high.

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Immediately above Kizil Arvat there is a magnificent mountain, which is seen for nearly 50 miles. Below this point the river Atrek maintains the same character of a sluggish stream, running through a plain, which in places is more than 10 miles wide, and in others the mountains close in and the valley narrows to a mere gorge.

At Pishkala the river is about 35 feet wide, 2 feet 6 inches deep, and runs at about 3 miles an hour. Pishkala is the last valley on this part of the Atrek. Below this it is entirely given up to the Turkomen.

We here left the river and crossed a range of hills into the Simalghan Valley, the water from which passes through a narrow gorge into the Atrek. A very high range of mountains separates the Simalghan Valley from the Shuhan Plain. The mountains are covered on their northern slopes with forest—the only forest we have seen except in the Mazanderān.

Shuhan is situated in another plain between high mountains, and through a gap in the southern of these two chains a little stream runs which leads into the plain of Esfaroyin, an immense plain, which extends to Sabzevar and Meshhed, and on which there are many villages. In this plain is Sanghos, a considerable town, with walls and towers, and which would make the most magnificent head-quarters for a sportsman. Here, on the plain, partridges and bustard may be found. Wild boar abound in immense numbers, and the extensive plain offers a ground for pig-sticking which can hardly be rivalled. There are immense herds of wild asses, which might be ridden down on well-trained horses. In the mountains are ibex and mouflon, and on the lower slopes are small deer.

This plain is of vast extent and little cultivated to the west. It extends to Shahrud and then on to the Great Salt Desert; and to the east of Meshhed, a sluggish stream runs through it which ultimately reaches Meiomid. The whole surface of the ground is encrusted with a saline deposit, in many places half an inch deep. There is little or no water on the northern side of this plain except this very brackish stream, nor are there any villages between Sanghos and Jah Jerm. Jah Jerm is a large and important walled town with towers, and a fort with a wide ditch: it is a garrison town, armed with one gun, for which there is, in all probability, no ammunition.

Beyond Jah Jerm we struck the usual main road between Meshhed and Teherān. It is too well known to Europeans, and has been described so accurately by Ferrier, who is one of the most trustworthy authors whose works I have ever read, that I shall close my remarks.

The rapidity of the journey must be an apology for the scantiness of the notes, but if the map or notes (however deficient they may be in themselves) are of any assistance to the future traveller, or in any way assist him in his researches, I shall feel that my work has not altogether been thrown away, nor the time that I spent on the journey altogether wasted.*

W. J. Gill, *Lieut. R.E.*

* We have taken Lieutenant Gill's route from his own manuscript map. The country adjoining it has been delineated from other authorities, including Markozof's map of the Lower Atrek, and of the Yomud country, Lemm's astronomical positions, the map accompanying Khanikoff's expedition, &c. We have, as a rule, adhered to Lieutenant Gill's spelling; the vowels, however, are to be pronounced as in Italian. Lieutenant Gill's altitudes have been inserted upon the map. They agree fairly with the results obtained by his predecessors.

Dr. G. Nachtigall's Explorations in Africa, 1869—1874.*

I have undertaken to place before the Geographical Section of the British Association a concise account of the travels of Dr. G. Nachtigall, whose name is as yet hardly known, except to professional geographers, but whose achievements entitle him to a foremost position amongst that numerous band of explorers who, within a comparatively small number of years, have done so much towards an elucidation of African geography. The principal scenes of Nachtigall's explorations are, the desert tract lying to the east of the main caravan route from Murzuk to Kuka; the country to the north and north-east of lake Tsad, and the region between Bornu and Upper Egypt. Many of the countries described by him have not previously been visited by European travellers, and our knowledge concerning them was based upon native information and itineraries. Nachtigall's journey through Wadai and Darfur to Egypt especially is deserving of commendation, as it has been repeatedly attempted, but in no instance with success. Barth proposed to visit Wadai, but instructions forwarded to him from England induced him to turn his steps westward to Timbuktu. Vogel, in 1856, penetrated to Wadai, but was executed by order of the Sultan of that country. Beurmann, in 1863, fell under the hands of assassins on the threshold of Wadai; and Rohlfs, in 1866, vainly sought an opportunity of visiting that kingdom. Darfur, on the other hand, was visited by Browne in 1793, and by Cuny in 1858, the latter dying there. The German Expedition, which was organised in 1861 to recover Vogel's papers, and continue the work begun by him, wasted its energies in the countries east of the Nile, and only one of its members—Mr. W. Munzinger—attempted to carry out the instructions issued to it. After a stay of three months at el-Obeid, the capital of Kordofan, he returned baffled, having failed to obtain permission to proceed to Darfur.

The immediate cause of Nachtigall's journey is to be traced to the desire of the German Emperor to mark his appreciation of the kindness with which the Sheikh Omar of Bornu had treated various German travellers, who had visited his dominions. Dr. Nachtigall, at that time body-physician of the Bey of Tunis, volunteered to accompany the presents, which it was proposed to forward to the Sheikh. From his long residence in Northern Africa, and intimate knowledge of the language and the customs of the country, he was peculiarly qualified for this duty. Nevertheless, in one of his numerous letters home, he expresses himself conscious of the inadequacy of his scientific attainments, and pleads his enthusiasm as an excuse for entering upon the enterprise before him. In this Nachtigall certainly underrates his qualifications. His barometrical, aneroid, and boiling-point observations, enable us to gain a fair idea of the hypsometrical features of the countries explored by him, and his inability to determine the position of places astronomically is compensated for by careful route surveys, ethnographical and historical researches, and the industrious collection of itineraries, and of other information from native sources.

* Read at the Geographical Section of the British Association at Belfast, August 1874.

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Nachtigall left Tripoli on the 18th of February 1869, and travelling by the well-known road *viâ* Sokna he reached Murzuk on the 27th of March. There he was delayed beyond expectation. The Welad Sliman and their Tibbu allies, had directed their raids against Bilma, on the caravan route leading to Kuka, and travelling under these circumstances was deemed unsafe.

Seeing no prospect of being able to leave Murzuk at an early date, and anxious to allow no opportunity to escape him of adding to our geographical knowledge of Central Africa, he resolved upon a visit to the Tibbu Reshade—the inhabitants of Tu or Tibesti. He arrived at this resolution in spite of the unfavourable reputation which these inhabitants of the Sahara enjoyed, and which his own experience did much to confirm. With four camels and four servants, he left Murzuk on the 6th of June 1869. His route first led along the beaten track to the south, but at the well of Tymmo, five days beyond Tejerri, he struck to the south-east, and after a most fatiguing march through the desert, during which he suffered much from the want of water, reached the hilly district of Afafi. In the geological structure of these hills limestone and dark-coloured sandstone predominate, and large blocks of basalt are scattered over the country. They are intersected by numerous torrent-beds, abounding in bright-coloured Talha trees, to which the grotesquely-shaped dark hills formed a pleasant contrast. Nachtigall resumed his journey on the 5th of July. His road led him over barren, gravelly or stony plains of a yellow hue, above which rose numerous isolated groups of serrated and castellated dark sandstone hills. The torrent-beds alone afforded scanty forage for camels, but no inhabitants were met with.

A striking change in the nature of the country was observed on reaching the torrent-bed called Enneri Tollobu, on the 12th of July. A light, porous rock, varying in colour, took the place of the gravel or limestone rock, forming an undulating surface, altogether barren of vegetation.

On the 13th our traveller reached Tao, the first inhabited place of Tibesti, at an elevation of about 2100 feet above the sea. Tao is not, strictly speaking, a village, for it consists merely of a few scattered huts made of Dum-leaf matting, erected in the vicinity of some bountiful springs. At the time of Nachtigall's visit, Tao, as well as the other places on the western slope of the Tarso chain which intersects Tibesti from north to south, was found to have been almost deserted, for scarcity of food had induced the inhabitants to retire to the hills, or to make their way to Bardai, the most considerable place of the country, on the eastern slope of the Tarso, where the date harvest was soon expected to begin. The Tibbu, indeed, is by no means too lavishly provided with food. There are herds of goats, but meat is eaten only on high holidays, or when a camel dies a natural death: nor does the camel yield milk except during autumn, when the luxuriant herbage induced by the rains has enabled it to recruit its strength. Flour is prepared from the grains of millet *(Panicum colonum)*, but dates are principally imported from Fezzan and other neighbouring countries, for those cultivated in the valley of Bardai do not suffice for the wants of the population. In times of scarcity the Tibbu has recourse to the innutritious shell of the Dum-palm fruit, an article of food not capable of itself to sustain life.

Nachtigall had now entered upon the hilly country of Tibesti, and first of all turned up the beautiful valley of Zuar, where water is plentiful, the vegetation luxuriant, and the scenery most picturesque, and animal life, though confined, as far as his observations went, to monkeys, gazelles, and birds, imparts some animation to the scene. It was in this charming valley that Nachtigall first experienced the rapacious and intolerant spirit of the Tibbu. On the 18th July he reached Zuar, where certain notables, who had already levied black-mail upon him during his progress up the valley, frustrated his intention of proceeding further to the south. Reluctantly our traveller retraced his steps to Tao, and there now remained two courses open to him, viz., either to return to Fezzan, or to make an attempt to reach Bardai, the hot spring near which exercised an almost irresistible attraction. Nachtigall was fully aware of the intolerant spirit which the Bardais were in the habit of exhibiting towards strangers, and of their rapacity and lawlessness, but he nevertheless resolved to venture upon the enterprise. As a precaution, however, he sent a messenger to Bardai, in order to obtain the permission of the Sultan. The messenger promised to return within eight days, but did so only after an absence of sixteen, during which the supplies of food were rapidly being exhausted. The Sultan had granted the desired permission, much against the will of his subjects, and Nachtigall resolved to avail himself of it.

On the 5th of August he left Tao. The hills, through which his route now led, consisted of sandstone overlying limestone. Blocks of basalt lay scattered about, and, on approaching the summit of the pass, the porous rock already noticed was again met with, covering large tracts of country. Not far from the pass, Nachtigall came upon a remarkable natron cavity of cup-like or circular shape, and having a circumference of 10 to 15 miles. At the bottom of this there rose a conical hill, having a crater on the top, the interior of which was filled with natron. The Tusidde, the highest summit of Tibesti, rose about 1200 feet above the pass to a height of 7900 feet. Descending the eastern slope of the mountain range, Nachtigall entered Bardai, after a journey of six days. His reception on the part of the populace was far from friendly; Muhammadan fanatics, excited by the immoderate use of palm-wine, called upon the multitude to slay the Christian dog, and it was only owing to the personal interference of Arami, one of the most influential chiefs, that Nachtigall was able to reach his protector's house in safety. There he was kept a strict prisoner. The Sultan refused to receive him; and of the pretty town of Bardai, with its detached huts of palm leaves, surrounded by gardens and date plantations, he was able to see but little. There being no prospect of further explorations, Nachtigall was anxious to return to Fezzan, and after much persuasion his kind protector consented to facilitate his flight. During the night of the 3rd of September, Nachtigall, with his servants, secretly left the town, accompanied for some distance by his protector; and after very rapid and fatiguing marches, travelling sometimes for thirteen hours a day, he again reached the wells of Tymmo, on the 20th September. The exhausted condition of his camels and servants ren-

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dering a few days' rest absolutely necessary, Nachtigall stayed here during three days, and then left for Murzuk. Having secreted his remaining baggage amongst the rocks, he started on the 23rd September, each man carrying a supply of fifty dates, which was to last for five days. On the second day the camels succumbed, and had to be abandoned, but our weary travellers struggled on manfully, and on the fifth day after their departure they were rewarded by the sight of the verdant palm-trees of Tejerri. There Nachtigall purchased a donkey, on credit, and on the 8th of October he was back at Murzuk, much exhausted from the hardships through which he had passed, but nothing daunted in the task of exploration which he had imposed upon himself.

After another prolonged stay at Murzuk, Nachtigall was at length able to leave that town on the 18th of April 1870, and which he did in the company of an ambassador despatched by the Pasha of Tripolis to the Sheikh of Bornu. His journey, from circumstances beyond his control, took place during the hottest part of the year, and at Bilma, where the temperature during the day rarely sunk under 113° Fahrenheit, he suffered particularly from the heat. On the 6th of July the caravan entered Kuka, the capital of Bornu, having been received outside the town by Bu Bekr, the son of Sheikh Omar, attended by a brilliant suite, amongst which were many Arabs and Tibbu, splendidly mounted. The cavalcade proceeded to the square in front of the palace, where the Sheikh, himself unseen, mustered it, and on the following day Nachtigall was admitted to an audience. He handed over on that occasion the presents of which he was the bearer. They consisted of a gilded throne, of portraits of the Emperor, the Empress, and the Crown Prince, which highly flattered the recipient; a clock with an allegorical figure, which shocked his Muhammadan prejudices; a number of needle-guns, which restored his good humour; a gold watch, telescopes, velvets, &c. Rohlfs had added to these Imperial gifts a harmonium; and after the damage due to the intense heat of the desert had to some degree been repaired by Nachtigall's Italian servant, the instrument emitted sounds sufficiently melodious to "soothe the savage breast."

Nachtigall stayed at Kuka uninterruptedly for more than eight months, and industriously availed himself of this enforced leisure for collecting materials on the geography of Bornu and the neighbouring countries. The Sheikh throughout that period, and until his final departure, treated him with the greatest kindness and consideration; and had it not been for his patronage, our traveller would probably not have achieved the success of which he is now able to boast. The rainy season of 1870 proved unusually heavy; the streets of Kuka were flooded, and the inhabitants of the islands in Lake Tsad and those of the shore villages abandoned their habitations. The excessively wet season brought on malaria, to which not only Arabs, but likewise the negroes (who are sometimes supposed to enjoy immunity from this disease), and even horses succumbed. The cattle disease, which has been ravaging the herds of Bornu during the last three years (the herd of one rich proprietor having been reduced from 31,000 to 300 head) must, however, be traced to some other cause. The only redeeming feature of these heavy rains consists in the exceptionally bountiful harvest, for in November the cwt. of millet or dukhn sold at Kuka for 1*s.* 10*d.*, and that of wheat for 4*s.* 6*d.*

Nachtigall, during his lengthened stay in Tripoli, Murzuk, and the Sudan, had many opportunities of seeing whether the laws for the suppression of the slave-trade, forced upon the Turkish Government by the Christian powers, were being carried out. In his opinion, they remain a dead-letter. The very ambassador who accompanied him to Kuka was charged to state that no further difficulty would be placed in the conduct of that traffic, and a caravan with 1000 slaves, all in chains, actually left for the north during Nachtigall's sojourn. The Governor of Fezzan is in the habit of levying a tax upon each slave imported, on payment of which they are allowed to be taken to Tripoli. There a further payment is exacted; and after the slaves have reached their various destinations, the public are reminded that there are laws in force which forbid this traffic. A young male slave now fetches in Kuka about 3*l.*, a good-looking young female from 5*l.* to 8*l.* and more; and as slaves are more readily procurable in Bornu than more legitimate articles of merchandise, they constitute almost the only article of export. Yet were a government to be established in these Central African countries determined to develop the vast natural resources of the country, the slave-trade might readily be abandoned in favour of more legitimate pursuits, without detriment to the wealth of the inhabitants.

After this lengthened stay at Kuka, Dr. Nachtigall, being obliged to borrow the necessary funds at usurious interest (for the moneys forwarded to him from Europe never reached their destination), and owing part of his equipment to the kindness of Sheikh Omar, was enabled to leave Kuka on his first exploratory expedition. It was his object to visit Kanem and the countries to the north-east of it, and the powerful Arab tribe of the Welad Sliman had undertaken to act as his protectors. Soon after his departure, which took place in the beginning of March 1871, Dr. Nachtigall fell ill, and was almost on the point of giving up his proposed journey. But a plentiful supply of camel's milk somewhat restored his failing health, and he persisted in his original plan. The country from Lake Tsad, as far as Birfo, where our traveller arrived on the 2nd May, and which lies on the frontiers of Kanem at a distance of some 130 miles from the lake, rises gradually. The road then descends into the lowland of Egai, and (having traversed a desert tract, three days wide) into that of Bodele, or Battele, which is of considerable extent, and probably communicates with Egai. Crossing this lowland in a north-easterly direction, our traveller after an exceedingly fatiguing march, reached the celebrated spring of Gelakka, in Borku, on the 31st of May. The journey thither had been attended by considerable difficulties, traceable to a great extent to the want of funds. His camels dead, his horse worn to a skeleton, himself reduced to a wretched diet of dates and millet-porridge, Nachtigall's sufferings were still further aggravated by the preachings of a Muhammadan missionary, who taught that the murder of a Christian would prove the most certain means of reaching paradise. Under these circumstances, his proposed journeys to Wadyanga and Ennedi had to be given up, and it was fortunate that his Arab pro-

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tectors, who had shown symptoms of leaving him to his fate, finally determined to stand by him. On the 23rd September he was able to start on his return journey, but being obliged to lead his worn-out horse, his progress was but slow. He paid a visit to Mao, where he thanked the generous man who had procured decent burial for the unfortunate Beurmann, and on the 9th January he re-entered Kuka. The Sheikh, as ever, received him most kindly, presented him with a horse, and re-equipped him; but his hopes of finding fresh funds for continuing his explorations were doomed to disappointment, for all that had arrived consisted of the modest sum of 50*l*.

The results of this journey are highly important from a geographical point of view, and throw fresh light upon the features of the Southern Sahara. Lake Tsad, with its numerous islands, appears to vary considerably in size according to the abundance of the rains, and at a former period discharged its surplus waters through the Bahr-el-Ghazal, 300 miles in length, in a north-easterly direction into an extensive lake, which then occupied the whole of the extensive depression of Bodele. The course of this ancient river can still be traced by a fringe of trees, and the existence of an old lake is proved by numerous skeletons of fishes and other animals found upon its ancient bed. The Welad Sliman even assert that Lake Tsad, after the unusually heavy rains of 1870, once more overflowed its banks in the direction of Bodele, and formed a river about 100 miles in length. From Bodele and Borku, the lofty hills of Tibesti can be seen in the distance, and not far from Borku there is a remarkable mountain, the Kussi, which equals the Tarso in height, and at the foot of which there is a hot spring, and a gigantic crater filled with sulphur and natron. From information gathered on the spot it would appear that the mountains of Tibesti are actually connected with the Jebel Marra of Wadai. The Welad Sliman, who usually reside in Kanem, because it lies nearer to markets, look upon Bodele and Borku as tributary territories. Once every three or four years they visit the fertile date plantations of Borku, appropriate the date harvest, and recruit their health and that of their camels in the more invigorating climate of that much-suffering province. Under these circumstances it need not excite surprise if we find that the 5000 sedentary inhabitants of Borku do not cultivate their fields with particular care, for they but rarely reap the fruit of their labour. The Welad Sliman, though they migrated to Kanem some forty years ago, have preserved the pure Arab type, for they brought with them their families. Not so the Mgharba, who, like the former, immigrated from Barka, and now live amongst them. Having left their wives at home, they have largely intermingled with the neighbouring Tibbu and negro populations. Wadyanga and Ennedi, to the north-east and east of Borku, are inhabited by Bele or Terrāwia, who differ from the Tibbu in language and traditions, and are probably kindred to the Zoghawa of Western Sudan.

Soon after his return to Kuka, Dr. Nachtigall started upon a fresh expedition. On this occasion the object of his journey was Bagirmi, one of the tributary states of Wadai, but at that time in a very unsettled condition. Sultan Ali of Wadai appears to be ambitious of establishing a powerful empire in the heart of Africa, and being still a young man, and possessed of qualities calculated to ensure success, he may be destined to succeed in his aim, especially as his once powerful neighbour, Bornu, is evidently in a decaying condition. The people of Wadai are warlike, and the majority are devoted to their sovereign and his policy. Still, in the eyes of the old Wadawi, Sheikh Ali is merely an usurper; the preference which he gives to the Arabs, and the contempt with which he treats the ancient usages of the country, are not calculated to propitiate their favour. Sultan Muhammad of Bagirmi had long been impatient of the yoke imposed upon him by the ruler of Wadai, and made no secret of the contempt he felt for him. Sheikh Ali's patience was at length exhausted; in 1870 he took the field, and after a siege of two months he succeeded in capturing Massenya, the walled capital of Bagirmi. Muhammad, however, and many of his adherents, managed to escape, and in the southern portions of his dominions he still continued to offer resistance. It was there that Nachtigall proposed to visit him, and accompanied by a messenger of the Sheikh of Bornu, he left Kuka on the 27th of February 1872, for that purpose. Two bullocks carried his baggage, and a serviceable aneroid and two thermometers enabled him to observe altitudes. This first part of his journey led through districts which are familiar to us from Barth's descriptions, but many towns which twenty years ago were described as populous, were now found to be almost deserted, for their populations had followed a fanatical Pullo pilgrim, whose preachings induced many Muhammadans of Bornu to rally round his standard for the purpose of accomplishing a pilgrimage to Mekka. When Sherif ed Din arrived on the frontiers of Bagirmi his followers constituted a formidable army. The predecessor of the present Sultan, dreading this influential fanatic, sought to conciliate him, but Sherif ed Din treated his offers with contempt; a sanguinary battle ensued, in which the Sultan forfeited his life, and the Sherif was free to pursue his course. He directed his steps towards the heathen countries of the south, but there met with unexpected resistance. The natives having concealed their stores of grain, supplies began to fail, many of his followers deserted, and the Sherif himself was slain whilst on a Ghazzia.

On the 14th of March Nachtigall entered Logonbirni or Karnak-logon, a large town of 12,000 inhabitants, situated on the river Ba-logon, here 300 yards wide. The governor of the town, though not friendly disposed towards the deposed Sultan, nevertheless permitted Nachtigall to proceed, and this in spite of the horse-dealers, who had joined his caravan in the hope of being able to sell their horses on advantageous terms at Muhammad's camp. The Shari was crossed at Miskin, where it is 420 yards wide and of considerable depth, and the caravan then followed the banks of that river as far as Mafalin, the numerous island villagers refusing to admit it for fear of the depredations which might be committed. At Mafalin Nachtigall turned to the south, and, passing many deserted villages, he reached the Sultan's camp, in the territory of the Gaberi, on the 4th of April. The king, whose temporary capital consisted of about 1000 huts surrounding a large square, received our traveller in the most affable manner, and even permitted him to enter the royal presence in stockings, although the custom of the country required that none should appear before the

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king except bare-footed, and with the upper part of the body uncovered. The ammunition and the horses brought by Nachtigall's caravan no doubt had some share in this favourable reception. Nachtigall's movements were left unfettered, and he accompanied several raids directed against neighbouring villages for the sake of grain and slaves. Frequently the heathen natives were able to baffle the attempts of their pursuers. They deserted their ordinary dwellings, and with their stores and cattle took refuge in the branches of gigantic bombax trees, where they built platforms, several families frequently finding shelter on the same tree. These trees could not be assaulted except at the sacrifice of many lives, and as the Bagirmis were not furnished with implements for felling them, they were fain to content themselves with now and then picking off one of the refugees with their muskets, and when the body dropped they mutilated it in the most barbarous manner.

When supplies began to fail, the Sultan shifted his camp to Gundi, the capital of Tummok, carrying by assault a village on the road, and killing or enslaving the whole of its inhabitants. On this occasion Nachtigall was wounded by a spear, which nearly put a a stop to further explorations. The Sultan was somewhat reluctant to part with our traveller. However, on the 30th July, Nachtigall was able to start on his return journey. He travelled in company with a caravan carrying slaves to Kuka, and was compelled to witness the revolting conduct of the slave-dealers, who mercilessly cut the throats of their victims whenever the whip failed in inducing them to struggle on. On the 7th September he was back at Kuka, and as usual was most kindly received by the Sheikh.

This journey to Bagirmi has added much to our knowledge of the Shari and its many branches, which shrink into a series of pools during the dry season, and also of the heathen populations of the south. With respect to these latter, a few remarks may be acceptable: they apply in the first instance to the Somrai, but are more or less applicable to many other tribes.

The Somrai are negroes of middle height and regular features, and only in few instances are they repulsively ugly. The men have the advantage of the other sex as regards features, though far inferior to it in figure. The dress of the men consists of a scanty piece of the skin of a goat, gazelle, or wild cat worn round the loins. They bestow the utmost care upon their hair, which they dress in the most extravagant styles, wearing it sometimes in small tresses arranged in ridges, in puffs projecting like horns from the four corners of the head, or in a conical structure built up on the forehead. Their arms consist of an iron knife and lance; footmen carry narrow shields of buffalo hide or wickerwork, 6 feet in length. They are good horsemen, and ride their active ponies—the backs of which are rendered sore by artificial means—without saddles or stirrups. The dress of the women is even more scanty than that of the men, for it consists merely of a thin rope or string of beads passed round the loins and between the legs, and tied in front. In addition to this they wear leather garters ornamented with kauri-shells, and bead necklaces, and pass a glass cylinder or a bit of wood through one or both lips. They either shave the whole of the head, or at all events the forehead, and in the latter case the hair is cut short. Both sexes cut out one of their incisors.

The Somrai believe in a supreme being who speaks to them through the thunder. The symbol of this deity consists of the portion of a trunk from which the bark has been peeled off in rings, and which is placed in a small hut near the dwelling-houses. Women and children are not admitted to this hut, where sacrifices of all kinds, including the *genitalia* of enemies slain in battle are deposited. Sorcery is firmly believed in; and the death of eminent persons, or even of favourite horses, is invariably ascribed to the action of a sorcerer, for whose discovery different stratagems are resorted to by each tribe. In Somrai the deceased person is placed on the heads of two men, when the feet will invariably turn in the direction of the house of the guilty person, on reaching which the bearers are supposed to be unable to proceed any further. The sorcerer is then brought out and killed, and his family sold into slavery. Persons subject to epileptic fits are supposed to be possessed of the devil and are likewise killed.

The dead are buried in circular graves, and with them is placed a goat, a few jugs of honey and melèssa (millet beer), and a cup filled with kauris. The Nyellem and several other tribes are in the habit of burying a living boy and girl with deceased chiefs, to keep off the flies, as they say; but this barbarous custom is now falling into disuse.

Polygamy, as might have been expected, is customary, and the number of wives merely depends upon the power of paying the required number of horses or dogs to the parents of the bride. Wives bearing no children may be sold into slavery, but after a wife has borne three children, she may return to her parents, the husband being supposed, in that case, to have received a fair equivalent for his purchase-money. The Somrai, as well as the other heathen tribes to the south of Bagirmi, are industrious cultivators of the soil, durra being their principal grain, which they exchange for tobacco, beads, and kauris. The villages are imbedded in groves of giraffe (karage) trees, Deleb and Dum palms, kautchuk and fig trees. The houses are of straw, with the exception of the grain store, which is a conical structure of clay, having its only opening on the top. Goats, sheep, and dogs are kept in addition to horses, and dogs are particularly valued as an article of food. Horned cattle are comparatively rare, and the domestic cat appears to be a stranger to these tribes.

We will now accompany Dr. Nachtigall on his last journey, through Wadai to Darfur, concerning which our information is still exceedingly meagre. He left Kuka in the beginning of March 1873, and passing to the south of Lake Tsad by way of Fittri, a month's journey brought him to Abeshr, which, since the destruction of Wara, is the capital of Wadai. Sheikh Ali received him with unexpected kindness, and placed no restrictions whatever upon his movements. Nachtigall, for a considerable time, led a retired life, partly because his want of funds precluded him from defraying the expenses of fitting out an expedition, partly because he feared to arouse the suspicions of the king; partly because in his then state of health, his desires were limited to reaching Egypt by way of Darfur. But with returning health his spirit of enterprise was again aroused, and when he found that political disturbances in Darfur would preclude him from leaving the country for a considerable time to come, he eagerly embraced an opportunity

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of visiting Dar Runga, one of the vassal states of Wadai, situated twelve days' journey to the south of the capital. He left Abeshr about the middle of August 1873, travelling in the company of a small body of horsemen, who escorted a newly appointed viceroy. Crossing the Bahar es Salamat the northern frontier of Dar Runga is reached in twelve days. Runga itself is a country of considerable extent, stretching southwards to about latitude 8° N. The Runga proper are Muhammadans, but the kindred tribe of the Kuti, in the south-western part of the country, are still heathen. Merchants from Darbanda and Bornu have established themselves in their district, and most of the ivory which reaches Darfur from Wadai is obtained there. The rivers of Runga flow westwards to the Shari, and the Bahar Kuta, a considerable river seven days beyond its southern boundary, is probably identical with Schweinfurth's Welle.

No details concerning Nachtigall's explorations in Wadai have hitherto reached us, but we learn from Khartum that a messenger despatched thence with supplies met him at the capital of Darfur, where he had arrived on the 17th of March 1874, in the company of an ambassador proceeding from the Sultan of Wadai to the Khedive. Our dauntless traveller had thus accomplished the most difficult portion of his journey to the east, and news of his safe arrival in Egypt may hourly be expected.*

Geographers who have followed with some attention the progress of African exploration cannot fail to appreciate the importance of Nachtigall's researches. He has unclosed to us the geography of a considerable portion of the Eastern Sahara; enlarged our knowledge of Bagirmi, and by his journey through Wadai and Darfur supplied us with a means of checking and utilizing the vast mass of information derived from native sources. His experience has shown that travelling in these countries is not necessarily attended with dangers of an unusual kind. Let us hope that his success may attract other travellers to the field of research so successfully cultivated by him, and that he may live long enough to enable him to boast not only of having achieved great things himself, but of having been the cause of still greater achievements on the part of others.

E. G. RAVENSTEIN.

THE NORTH AMERICAN BOUNDARY SURVEY.

THE paper, which was read at the last meeting of the British Association, consisted of two reports by Captain Anderson, R.E., dated the 31st of May 1873 and 16th of March 1874 respectively. In the former of these reports, Captain Anderson says—"The officers and detachment of forty-four Royal Engineers left Liverpool on the 22nd of August 1872, with an outfit of all special stores and instruments required for the expedition. Proceeding *viâ* Quebec and the Canadian lakes to the western extremity of Lake Superior, the party travelled through the State of Minnesota by rail, to the head waters of Red River, thence, partly by marching and partly by river transport, reached the frontier at Pembina, Red River, on the 20th of September.

The Staff of H.M.'s Commission consisted of the commissioner (Captain Cameron, R.A.), chief astronomer (Capt. Anderson, R.E.), two assistant-astronomers (Capt. Featherstonhaugh, R.E., and Lieut. Galwey, R.E.), two surveying officers, secretary (Capt. Ward, R.E.), surgeon, veterinary surgeon, and naturalist.

Three astronomical parties were organized under the respective astronomers; two surveying parties, under the surveying officers; and an additional surveying party under Serjeant Kay, R.E. The astronomical and surveying parties left the head-quarters camp on the 1st of October, and proceeded to commence operations at different points near the boundary between Red River and the Lake of the Woods. Light four-wheeled, two-horsed waggons were used for transport over the open country by the astronomical parties, and light two-wheeled country carts, drawn by ponies, were used by the surveying parties, who also employed canoes in districts where water transport could be used with advantage. Depôts for provisions and stores were formed at convenient points along the boundary, from which the working parties were supplied. The month of October was very favourable for work, but the country between Red River and the Lake of the Woods being very swampy, surveying operations were attended with much difficulty, till the frost set in on the 11th of November. The boundary line was determined at points 20 to 30 miles interval by zenith telescope observations, giving a result, with a probable error in latitude of ± 10 feet, and from the principal points, fixed astronomically surveyed lines were traced connecting the several stations. At the same time a survey on the scale of 4 inches to 1 mile was made of the country extending for 6 miles north of the boundary. The work was continued throughout the winter, that being the only season in which the swamps could have been surveyed, and when the cold weather set in, a liberal supply of buffalo robes and leather suits were issued to the men, and a small sheet-iron box stove for every tent. As the winter advanced the supplies were sent out to the depôts on sledges, and distributed to the working parties by ponies with flat trains or 'tobogans,' and latterly by hand sleds and dog trains, when the snow became too deep to travel. The work was continued uninterruptedly till the winter broke up, and the survey in this section being finished, the rearmost party returned to head-quarters on the 5th of April, travelling with dog trains through the swamps, which were now continuous water and mud.

A summary of the work accomplished by Her Majesty's Boundary Commission, from the 20th of Sept. to the 5th of April, may be briefly stated as follows:—

The determination of five principal astronomical stations, viz., Pembina, West Roseau, Pine River, Lake of the Woods, and North-West Angle.

The tracing of sight lines near the boundary throughout, from Red River to the Lake of the Woods, a distance of 88½ miles.

The demarcation of the corrected boundary-line from the Lake of the Woods westerly for 32 miles, to the adjoining astronomical station.

The tracing of the due south line from the initial point of the boundary at the north-west point of the Lake of the Woods, to the open lake, 16 miles.

* Since writing the above Dr. Schweinfurth has received a telegram from Khartum announcing Nachtigall's arrival in Kordofan.

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The determination of the longitude of Pembina by electric telegraph from Chicago Observatory.

A survey by triangulation and traverse of the North-West Bay, and west shore of the Lake of the Woods.

A survey of the 6-mile belt of the country north of the boundary from Red River to the Lake of the Woods, covering an area of 530 square miles.

A line of instrument levels along the boundary from the Lake of the Woods for 48 miles westerly, supplemented by simultaneous readings of aneroid barometers for difference of level, at different points over the whole country examined during the season.

A complete set of magnetic observations at Pembina and North-West Angle stations.

A series of meteorological observations at Pembina, taken continuously from the 1st of October to the present date, and a corresponding set at the Lake of the Woods from the 11th of October to the 10th of December.

Forty photographic views taken during the progress of the work.

The boundary-line surveyed during the past winter commences in a swamp at the north-west point of the Lake of the Woods, and extends due south for 16 miles through tamarac and cedar morass. This swamp has a mossy covering, which is very treacherous, giving way under foot, and underneath is stagnant water, 3 to 4 feet deep and generally a gravelly bottom. This stagnant water does not freeze in winter. After passing through 16 miles of this swamp the boundary enters the open lake, and continues due south for 12 miles across the lake till it strikes the 49th parallel of N. latitude, which it then follows westerly, still in the waters of the lake, for 5 miles to the western shore of the lake. It then passes through a narrow belt of poplar, and crosses an open swamp 2 miles wide, then strikes into willow bushes and stunted growth of tamarac trees, and afterwards a thick growth of cedar, birch, and tamarac. Then, traversing the north end of a swamp, and through 2 miles of 'windfall,' it crosses, at 17 miles from the lake, the East Roseau River. From this point, for 9 miles westerly, the boundary passes over slightly elevated ground, covered with dense spruce and cedar, and, in places, a great entanglement of 'windfall.' The district to the north was formerly covered with Norway pine, but has been devastated by fire, and is now covered with a confused mass of brulé and 'windfall.' After crossing a narrow, gravelly ridge, where a few Norway pine occur, and 26 miles from the lake, the line crosses the Pine River swamp, which is 6 miles wide, and after passing through 3 miles of tamarac and spruce beyond this swamp, it traverses the Great Roseau swamp, 12 miles in width. The line then enters a forest of spruce and cedar extending for 11 miles over dry gravelly ground to the crossing of the Roseau River, the waters of which are nearly on a level with the adjacent country. From this crossing, which is 55 miles from the Lake of the Woods, the boundary passes over continuous swamps for 13 miles, through poplar islands, and among granite boulders, and then crosses a ridge with a fine gravelly plateau. It then traverses a low-lying level, with swamps and poplar islands at intervals, till a second ridge is reached, 76 miles from the lake. From this ridge, which is raised 30 feet above the adjacent prairie, the boundary passes over a stretch of dry, open prairie for 9 miles, and for a further distance of 3 miles to the Red River, through a scattered growth of elm, scrub, oak, and poplar, 88½ miles from the Lake of the Woods, in which distance there is a fall westerly of 340 feet. At Red River the water flows between steep, muddy banks, 34 feet below the prairie level, and the clay subsoil has a top-dressing of rich, alluvial black mould. With the exception of the prairie land for 14 miles east of Red River, the country along the boundary between Red River and the Lake of the Woods is not fit for cultivation.

A short account of the progress of the seasons during the period now under consideration may be considered of interest. Winter set in on the 11th of November, and continued till the 1st of April. During this interval of 141 days the maximum thermometer on eight occasions only rose above freezing point. Ice began to form on Red River on the 11th of November, and three days later it was safe to cross on foot. The ice reached a maximum thickness of 40 inches by the end of February, and by that date the ground was frozen to a depth of 76 inches. The snow on the prairie reached a maximum depth of 27 inches. The river was clear of ice on the 28th of April. The mean temperature for the successive months was as follows:—

October +41°, November +16°, December −7°, January −7°, February +2°, March +10°. The lowest temperature registered was 51° below zero on the 24th of December. A terrific snowstorm swept over the country and lasted for three days—7th, 8th and 9th of January—causing a loss of 250 lives in Minnesota. The boundary parties, who were all in the field at the time, scattered at different points along the line, escaped with only a few frostbites."

In his despatch of the 16th of March 1874, Captain Anderson says: "The organization of the working parties throughout the season was as follows:—One reconnaissance party; two astronomical parties; three surveying parties; the strength of the commission during the working season numbering 275 persons.

The field operations were conducted in the following order:—

1. The reconnaissance; 2. The establishment of the astronomical stations, and the connection of the stations, by surveyed lines, both these operations being carried out by the astronomical parties; 3. The topographical survey of a belt of country along the boundary in British territory.

The object of the reconnaissance was to explore the country in advance of the working parties, to find wood and water, to determine the sites for the astronomical stations, the sites for the commissariat depôts, and to mark out the line of travel to be followed by the working parties, as well as the routes to be taken by the commissariat trains. Principal depôts for supplies were established along the main line of communications, at intervals varying from 120 to 150 miles, and sub-depôts at intervals of from 50 to 75 miles. A corps of seventy-five half-bred scouts, armed with breech-loading carbines and mounted on Red River horses, was organised for escort duty. The scouts, in parties of two, were distributed 2 to 3 miles in advance, and the same distance on each flank of the waggon train, to give early information of the approach of Indians, and to examine the country for water. The exploration across the great plains necessitated the

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same method of working as at sea—that is to say, ascertaining the latitude with the sextant, finding the time, and deducing the difference of longitude from chronometers, and in the absence of land-marks, the line of travel, being as nearly as possible due west, was guided solely by compass. Five reconnaissances were made during the summer season of 1873, exploring the country for 90 to 100 miles due west on each expedition. The instruments used on the reconnaissance were an ordinary 8-inch nautical sextant, artificial horizon, a prismatic compass and four pocket chronometers. The chronometers gave excellent determinations for the distance travelled. The general rate of travel with two-horsed waggons, loaded with about 1200 lbs. weight, was 3¼ miles per hour, or 22½ miles per day.

The astronomical and surveying parties worked independently, each party having entire control over its own transport train, but depending for supplies of food and forage on the depôts which were established and stocked as the work advanced. The principal commissariat trains travelled backwards and forwards on the main line of communications only, while smaller trains were attached to each depôt for local employment, and delivered supplies at the different camps. For some sections of the work, in addition to supplies of food and forage, both wood and water had to be carried. The water was carried in specially made water-carts arranged for single draught. As the work was pushed forward, the line of communications gradually lengthened out westwards, till the 10th of October, when, as previously arranged, field operations were suspended, and each party independently retreated to winter-quarters at Red River, the rearmost party arriving there on the 31st of October, three days after the closing of the river. The winter had set in a fortnight earlier than usual, and navigation, which had commenced on the 1st of May, was suddenly stopped on the 28th of October. The river-steamers were frozen in at points of the river where they happened to be on that date, and have been compelled to pass the winter in very inconvenient places.

A summary of the work accomplished by Her Majesty's Boundary Commission during the summer season of 1873 may be briefly stated as follows:—

1. A reconnaissance of the boundary line and the country to the north of it for a distance of 437 miles due west of the Red River, based upon a series of latitudes and longitudes astronomically determined at thirty-eight points.

2. The determination of ten principal astronomical stations, established by zenith telescope observations, near the boundary.

3. The tracing and chaining of surveyed lines connecting the astronomical stations, and the construction of earthern mounds, in conjunction with the United States Commission, along 408 miles of continuous boundary line west of Red River, the British Commission accomplishing an aggregate of 220 miles, including 8½ miles cutting through the wooded district of Pembina Mountain, and 24½ miles of cutting through Turtle Mountain.

4. A topographical survey of the country north of the boundary for a width of from 6 to 15 miles, from Red River for 400 miles due west, plotted on a scale of 4 inches to 1 mile. This survey covers 3004 square miles of country.

5. A series of meteorological observations at Red River for the whole of 1873, in addition to magnetic and barometrical observations taken by the working parties in the field.

6. A series of 129 photographic views, illustrative of different portions of the boundary and adjacent country."

The following notes are submitted descriptive of the country traversed by the international boundary line from Red River to the westernmost point explored last season. At the boundary crossing Red River is 75 yards wide, 10 feet deep at its mean summer level, and flows northward with a current of 2½ miles per hour. The river at the frontier line is 752 feet above the sea level, and 34 feet below the general prairie level. From this point westerly the boundary crosses 35 miles of alluvial prairie land, well suited for the growth of cereals and vegetables. The boundary then enters, by a gradual ascent, a wooded district, called Pembina Mountain, the first prairie steppe, and after traversing 12 miles of a very rugged and wooded country enters upon the great plains, at an elevation of 1400 feet above the sea. These plains have a poor gravelly soil, with numerous granitic boulders scattered in all directions, and patches of luxuriant grass grow here and there in hollows, where moisture remains and keeps the grass green for two or three weeks after the general prairie is scorched by the heat of the sun. After entering the great plains no wood or permanent supply of water is met with along the boundary, for a distance of 68 miles. The latter portion of this district is undulating, like a land sea, and occasionally on the plain there is a little eminence or "butte," from which the vastness and monotony of the plain in every direction may be seen and realized. In consequence of the poorness of the soil, the frequency of night frosts during the summer, and the scorching heat of the sun during the summer months, these plains are not suited for the growth of cereals, but pasture is plentiful, and there is seldom any difficulty in finding swamp water in some of the low-lying hollows. Innumerable and well-defined buffalo trails cross and recross these plains in every direction, and the bleached skulls and bones of the buffalo killed in the wholesale battues of former years are scattered on all sides. The commonest animal now met with on the plains is the badger, and the prairies are completely honey-combed by badger holes.

After traversing 68 miles of plain the boundary enters, by an ascent of 200 feet, a well wooded plateau called Turtle Mountain, full of lakes and little swamps; and this feature, which extends for 30 miles to the south, protrudes into British territory, so that the boundary in its westward course passes through 34 miles of the wood, lakes, and swamps of Turtle Mountain before emerging again on the plain. The plains then continue for 138 miles further west, at an average elevation of 2000 feet above the sea, the soil becoming sandy, supporting a scant herbage of bunch-grass, and affording pasture for a few herds of antelopes. The great plains in this section of the country come to an end 280 miles from Red River, and the boundary, by a gradual ascent of 250 feet, enters the very marked feature called the Great Côteau, the second prairie steppe, which crosses the country from north-west to south-east. This côteau leads to a very remarkable plateau 2250 feet above the sea, composed of a suc-

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DOMINION BOUNDARY,

from the L. of the Woods to Long. 107° W.

to illustrate Reports by Capt. Anderson R.E.

Scale 1:750.000. 0 5 10 20 30 Stat. Miles.

99° 98° 97° 96° 95°

103° 102° 101° 100° 99°

107° 106° 105° 104° 103°

49°

Alluvial Prairie Land

M A N I T O B A

D A K O T A

M I N N E S O T A

Great Plain of the Souris

Great Plain

M O N T A N A

Pembina R. — Calf Mountain — To Fort Garry — Camp IX — Camp X — Camp XI — Dry Dance R. — Eastern Limit of the Great Plains — Swamp with Granite Boulders — Camp IV — Long R. — Sta. 8 — Sta. 7 — Sta. 6 — Pembina Mountain — Pembina Depot, 1004 — Camp II — Pt. Allard — Poplar Island — Sta. 5 — Camp I — Pointe Michelle — Pembina R. — Dufferin — Hudson's Bay Co. — Sta. 4 — Pembina — St. Joe — St. Vincent — Railway to St. Vincent (Projected) — Open level Prairie — St. Boniface — Red R. — Rat R. — Sand Rapids — Roseau R. — Roseau Swamp — Roseau Sta. (No. 3) — Pointe d'Orme Depôt — Pt. of H.B. Co's Pp. — Roseau Lake — East Roseau R. — Fine Section — Cotes Sta. (No. 2) — Depôt — Tamarac Swamp — Portage 12 m. — Muskeg Portage — White Mouth L. — N.W. Point — North West Angle Sta. — International Boundary — Buffalo Pt. — L. of the Woods Sta. (No. 1) — L. of the Woods

Souris River — Lignite Beds — Rocky Creek — Wood End Depôt 1889 — St. Peters Spgs. — Sta. 16 — Short Creek — Sta. 15 — Hill of the murdered Indians — River Lake — Sta. 14 — Second Crossing, 231 — Indian Graves — Old Mandan Co. — Peers Head Ford (1st. Crossing) — North Antler Creek — South Antler Ck. — Ind. Graves — Sta. 13 — Sta. 12 — Not Fordable here — White Water L. — Turtle Head Ck. — Turtle Hill — Sta. 11 — Turtle Mountain — Turtle Depôt — Camp VIII. — Gravelly and undulating Plain — Sta. 10. (Camp VI.) — Sta. 9. — Camp V — Traders Road — Lac des Roches — Badger Ck. — Camp IX

Wood Mountain — Valley & wooded Coteau — Hunters' Set. — Settlement 2654 — Pyramid — Low Hills and numerous Creeks flowing South — Pyramid — Pyramid Ck. — Porcupine Ck. — Sta. 23 — Sta. 22 — Sta. 21 — Range of Highlands — Highlands — Upland Prairie — Edge of Coteau — Sta. 20 — Chain of Pools — Sta. 19. — Traders Road to Wood Mtn. — Souris R. — The Great Coteau — A succession of Hills and Valleys — Broken Prairie — Gravelly Desert — Arid Plain — Wood End Depôt 1889 — Sta. 18 — Clear Depôt, 2242 — Sta. 17 — Traders Road

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cession of ridges, valleys, and basins, presenting in section a very broken and irregular profile, and the whole district has the appearance of an ancient lake bottom upheaved. The boundary in its progress over this wild and weird country, crosses no well-defined ridge or watercourse, but the same confused monotony of ridges and hollows. This continues for 33 miles, when the boundary enters a country of alkaline lakes, which dry up during the autumn, and leave a white deposit which contrasts strikingly with a bright crimson plant growing on the margin of the lakes. The chain of alkaline lakes extends for 15 miles, and over the whole of this district, as well as the district of the Great Côteau, the waters have no outlet to the ocean. The boundary having crossed this great central waterparting, and leaving the waters that drain northwards into Hudson's Bay, comes upon the Missouri system of waters, which flow southwards into the gulf of Mexico. A great change is now observable in the topographical features. Owing to the nature of the soil, which is of clay and very friable, the rainfall has denuded the whole face of the country into deep ravines, and the ridges seen in profile against the sky line, have a very bold and rugged outline. The boundary crosses 30 miles of this very broken country of ravines and ridges, and then enters upon a more undulating country, crossing several fine creeks, bare of timber or bushes, and, at an elevation of 3300 feet, comes upon the heads of a series of rugged ravines opening out south-westward. Occasionally, in sheltered corners having a northern exposure, a few poplar and aspen are found. Wood, however, is very scarce, and there are two sections of the boundary, each 80 miles across, where no timber or brushwood is met with. Lignite coal was found in seams of 2 to 5 feet in thickness, and when mixed with wood and burnt in a stove, with a strong draught, answered very well for fuel. In the ravines at the westernmost point of last summer's exploration, two herds of buffalo, six in a herd, were seen, but the great herds are 200 miles further west. The great migration of the buffalo from the vicinity of Red River settlement, to the country 600 miles further west, has occurred within the last fifteen years.

The first half of the summer season did not prove very favourable for work on the plains. The constant mirage impeded surveying operations greatly during the day, and astronomical observations were much hindered by the incessant attacks of the mosquitoes at night. From 15th May to the middle of August mosquitoes swarm in myriads, and at night attack the horses so fiercely, that the stamping and snorting of the suffering animals may be heard throughout the night. Turf fires are kept going in front of the picket lines, and the smoke affords some relief, but it is only during the heat of the day, when the mosquitoes become torpid, that the horses are able to rest. In Pembina Mountain grasshoppers or locusts were met with in great numbers, and proved destructive to tents and clothing. The great plains are noted for the thunderstorms that occur two or three times every week in June and July. These storms usually give an hour's warning, and when the full force of the storm is overhead the plain is converted for the time into a vast lake, and frequently every tent in the camp is blown down during the fury of the storm. The lightning appears in balls of fire plunging into the ground, and in such quick succession that at night the air seems to be continually illuminated. The season of thunderstorms expiring early in August, was followed by six weeks' drought, and the prairie grass becoming parched, readily caught fire. For a period of two or three weeks prairie fires were very general, and it was only by incessant vigilance that the working parties saved their camps and their horses from the fire. By the 15th of September fires had swept through the country, and along the whole line of travel the ground was blackened, and as bare of herbage as the sea shore, except in occasional swamp holes, where small patches of grass had escaped the fire. In anticipation of the requirements of the return journey, hay was made and stacked at convenient intervals along the travelled route, so that the transport animals were amply provided with fodder on their homeward march to winter quarters. After the six weeks' drought the equinoctial snow storms set in on the 22nd of September, and caught all the working parties at different points on the plains. These storms set in with great violence from the north-west, and lasted, with occasional short lulls, for five days, during which period work was necessarily stopped, and the working parties made the best shelter they could for themselves and their horses. The supply of fuel at this period was just sufficient for cooking purposes. Twelve inches of snow fell during these storms, and the snow remained on the ground for three weeks, rendering both surveying operations and travelling very laborious at the end of the season.

AMERICAN EXPLORATION.

The Survey of Dr. F. V. Hayden.

Mr. Alvan S. Southworth, Secretary of the American Geographical Society, who represents that body with the Hayden Rocky Mountain Expedition, sends us a brief abstract of its labours as follows:—

"Professor Hayden arrived at Denver on the 15th of July, and immediately divided his expedition, consisting of sixty people and 120 horses and mules, into seven distinct sub-expeditions, the operations of each one of these bodies being so directed as not to overlap the territory of any other. The average number of people in each of the minor expeditions is eight, and each one is so organised as to contain a geologist, two topographers, a barometrical observer, two mule-packers, and a cook. Although each of the distinct divisions might lead the reader to suppose that the work is of the same general character throughout, it should be said that, primarily, the survey is divided into three grand divisions—north, middle, and south—of Colorado, each grand division embracing on the average 8000 square miles of territory to be surveyed topographically and geologically this season, besides making important collections in natural history, botany, and palæontology. Besides these divisions, Professor Hayden has wisely provided a photographic party under the command of an accomplished mountain artist, Mr. Jackson, who has already made over 2000 negatives of Yellowstone scenery, Indians, peaks, valleys, and natural wonders. Mr. J. T. Gardner, the geographer, with his own subdivision, carries on the primary triangulation from the summits of the loftiest peaks,

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connecting the work of all other surveyors by accurate triangles, measured by a seven-inch theodolite. I am thoroughly acquainted with the *personnel* of the entire expedition, and although my journeyings have been confined to the operations of Dr. Hayden's party, I can say, without exaggeration, that no survey was ever organised in the United States combining so much experience and active professional talent, with a genuine taste for exploration. The topographers, geologists, and naturalists, with two exceptions, are graduates of the colleges and the first scientific schools, and all of them seem to have a special aptitude for mountain climbing, which, although not as severe as the ascent of the Matterhorn, is yet accompanied with great peril and fatigue, especially when the peaks jut up almost perpendicularly in columns of eroded granite.

"With Professor Hayden's party I left Denver on the 24th of July. His sub-expedition then moved along the base of the Great Colorado, or Firout Range, taking new altitudes, inspecting curious mineral deposits, and finishing the topographical work of 1873. Dr. Hayden developed a new feature in physical geography during this stage of the march, discovering the ancient shore line of the great inland ocean during the Triassic period—the upturned edges of the sedimentary rocks inclining from the eastern slope of the Rocky Mountains. On the 4th of August we passed through Burgen's Park, a stretch of beautiful undulating country thickly timbered, watered by cool streams, and supplied with an abundance of game and trout. Thence to Granite, the westernmost mining village of this region, we passed the well-stocked ranches of new settlers, who claim to be driving a thrifty business. Examinations of the previous work of Dr. Hayden and of his reports on this territory, convinced me that he has been a diligent and conscientious servant of accurate science. Passing Twin Lakes we moved into the unknown country, and for the last two weeks we have been exploring the Elk Mountains, a range richly stocked with elk, antelope, deer, and grizzly bear. The peaks range from 12,000 to 14,700 feet in height, being in most part granite and sedimentary rocks, thrust up by volcanic action, and perpetually covered with snow and ice. The scenery is coloral, embracing every variety of land and water-scape, from the genial Andean vistas to the grander Alpine views. On this the Pacific side of the Sawatch Range—the main divide between the Atlantic and Pacific waters—twelve new topographical stations have been fixed by Mr. Chillendar, and many peaks ascended, and splendid sketches, geological and otherwise, made by Mr. Holmes. It is probable that before the 1st of October over 100 new peaks will have been determined in altitude, topography, and geology. Mount Daly, named after Chief-Justice Daly, President of the American Geographical Society, rises 13,700 feet above the level of the sea, adjoining Capitol Peak. It is a noble mountain near the end of the Elk Range. Capitol Peak itself is 13,800 feet, Snow Mass 13,785, and Sofris 12,800; with many others as Pyramid, Gothic, Maroon, Castile, Italia, ranging from 12,000 to 13,500 feet. Before the expedition terminates its labours, over 25,000 square miles will be covered by its industrious scientists, and it is expected that the vast area of unknown drainage in Colorado will be thoroughly mapped. I wish I could give you more in detail the important results already obtained, but our movements are too rapid to permit me to write more at length at this time.

"ALVAN S. SOUTHWORTH."

THE VOYAGE OF THE 'CHALLENGER.'

V.

As with Marion Island and the Crozets, the discovery of Kerguelen Island is due to a Frenchman, Lieutenant Yves J. Kerguelen, who, in command of the French ships of war 'Fortune' and 'Gros Venture,' discovered it on the 13th of January 1772 (the same day that Marion discovered the island named after himself), and revisited it in the ships 'Rolland' and 'Oiseau' in 1773. In the first of these voyages Kerguelen made the two islands off the west coast, which were named after his ship, Fortune Islands; the main island was also seen, but the ships were so disabled by stress of weather, as to necessitate the commander to make the best of his way to Mauritius to repair damages.

As the object of his first voyage was to discover the great mass of land then supposed to be absolutely necessary to balance that known to exist around the Northern Pole, great importance was attached to this discovery, and a very inflated account of its nature went forth, which led to the second voyage. On the 14th of December Bligh's Cap, or, as it was called by the discoverer, Réunion Island was made, and landing was effected in Christmas Harbour, then called Bay de l'Oiseau, and afterwards in a bay on the south-west coast.

Owing to various circumstances, much confusion prevailed in the accounts published of these expeditions, and so little was known about it when Captain James Cook in his last voyage, already mentioned, visited the island in December 1776, that he named it, from its barren and desolate appearance, Desolation Island, by which name it is even now frequently known. Cook remained in Christmas Harbour four days, and two more were spent in delineating the east and south coasts.

Both Kerguelen and Cook agree in their accounts of the inclement weather prevalent at this island, and this in midsummer; for while the ships of the first named were disabled, Captain Cook experienced strong gales, producing a tremendous sea and seven days of nearly continuous fog; whilst from the boggy nature of the ground and the torrents that poured down every ravine, the rain must have been almost constant.

Kerguelen Island lies in much the same latitude in the southern hemisphere as England does in the northern, and even a little nearer the Equator, it being between 48½° and 50° south latitude, and between 68½° and 70½° east longitude. The island is about 90 miles long, and its greatest breadth about 45 miles; but some parts of the island are so narrow that the isthmus between the two coasts are called by the sealers *haulovers*, from the facility they give in getting from one coast to the other by hauling the boats across. There are a number of outlying islands off the coast.

In 1799 an intelligent master of a sealing vessel,

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Mr. Robert Rhodes, commanding the 'Hillsborough,' remained several months at the island, and, in addition to the object of his voyage, made so good use of his time that he was enabled to trace much of the coast line; and although his work would scarcely bear a test in regard to accuracy, it was, nevertheless, considering the means at his command, an exceedingly creditable piece of work, and has, in fact, formed the groundwork of the larger portion of the island in the published charts to this day.

In 1840, Captain James Clark Ross, in the Magnetic Expedition, consisting of Her Majesty's ships 'Erebus' and 'Terror,' made Christmas Harbour his head-quarters for sixty-eight days; and although from its being in the depth of winter—June and July—extensive excursions could not be made for the examination of the coast, still we get a more perfect knowledge of the natural products, and a better description of the formation of the northern part of the island than from any other source.*

Christmas harbour is situated at the northern extremity of the island, the promontory of Cape Francois (the northern point of the island), forming one side of the harbour, which is open to the east. The south point of the harbour entrance is Arch Point and the well-known Arch Rock, a remarkable perpendicular basalt rock 150 feet high, standing detached from the cliff and having a well formed arch through it. Between the Arch Rock and Cape Francois the distance is nearly a mile, and from this line to the head of the harbour is 1¾ miles. On the south side a deep bay is formed between the Arch Rock and a point half the distance towards the head, and which point contracts the inner or upper harbour to about 800 yards. At the head of the harbour is a beach of fine dark sand, and on this beach Captain Ross had his observatory placed. On each side of the harbour hills rise to a considerable height; those to the south are very precipitous with a narrow beach covered with large stones and brown vegetation. Cook's view of the harbour is tolerably accurate. The upper bay is full of weed, *Fucus giganteus*. This remarkable plant is so thick that it is with the utmost difficulty that boats can be forced through; the pendant leaves from the pear-shaped bladders at the stem form an obstacle so dense that it is an obstruction, and the difficulty of keeping the oars from entangling in it prevents the power of the motive force from being of use, and an ordinary breeze acting against the boat will prevent progress altogether. A number of men from the 'Erebus' and 'Terror,' with sharp cutlasses fastened to boat-hook staves, were employed for days cutting a lane through this weed to enable the boats to have free access to the shore—a work of necessity with so much gear to land and such constant communication required. On the north side of the harbour near the head is a projecting little headland or cliff, to which the temporary name of *Cook's Wharf* was given; and here the armourers forges were established, and much work done during the stay of the vessels.

Notwithstanding the formidable look of the terraced hills they were by no means difficult of access, as here and there ravines had been made by the rushing water that enabled the perpendicular basaltic steps to be surmounted. The ascent to the black hill so conspicuous in Cook's view (called Mount Havergal by Captain Nares), was over a succession of flats and terraces. On approaching the black cliff, when about 400 feet above the sea, a quantity of fossil wood was found embedded in the rock, and so natural was its appearance that at first it was thought to be wood left by accident by whalers, or even Captain Cook himself. The ascent from there to the summit of the rock overlying this fossil bed is composed of a trap-conglomorate of great hardness. The trunks, which were numerous, were covered by a layer of shale, which probably protected them from being carbonized by the volcanic stream; some of them had much the appearance of recent wood, the bark and concentric layers being most evident, sometimes amounting to more than a hundred knots, and holes where branches had been broken off were also common. In some specimens the inner part of the wood was converted into a very hard, black, shining, crystalline mineral, some clefts or rifts in others containing small cinnamon-coloured crystals of transparent mineral. The most beautiful specimens were of a light gray colour with darker graining. The trunks lay packed together in beds of from 1 to 3 feet in thickness, some being many feet in length. A recent vein of lava having intersected the rock in one part also passed through the fossil wood, and the wood through which it passed was turned into a mineral resembling coal which does not burn.

The ascent from this to the summit of the rock was more difficult, there being much ice and snow. The mosses were beautiful. The top of the hill was flat, and a curious regular wall of trap-rock crossed the surface; it was straight, and from 2 to 4 feet high, broken here and there; it had evidently been left standing by the disintegration of the surrounding rock. Large and beautiful lichens were abundant; and many beautiful minerals were exposed by the continual fall of the cliffs, which laid open large cavities filled with crystal of cubicite, and also some very fine yellow ochre and cinnamon coloured masses of crystal.

The northern shore of the harbour is overlooked by a curious hill with a conical summit, which forms Cape Francois. The lower terraces of which it is composed consists of hard stratified basalt; the cone is also formed of hexagonal pillars, but they are broken up into angular fragments, or in some places bent and so tilted up that the bases of the prisms are exposed, forming small tesselated walls. The summit presents the appearance of a crater (which it undoubtedly is) bounded by an uneven ridge of loose stones, with a small shallow pool in the centre; the diameter of the summit is about 100 feet east and west and 50 feet across.

As the visit of the 'Challenger' to Kerguelen Island was partly due to the forthcoming transit of Venus, in obtaining information to help the astronomers, and as it was not known at what time the expedition for that island would leave England, a large cairn was built in which to deposit such information as could be collected for the purpose. No time was lost; surveying parties were organised, and

* Without trespassing on the domain of the published account of the voyage—*A Voyage of Discovery and Research in the Southern and Antarctic Regions*—the author is indebted to some notes from the private journals of the late Captain Alexander John Smith, R.N., and of Dr. J. D. Hooker (now President of the Royal Society), both of whom served in the expedition; he is also in possession of his own notes, made at the same time.

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the staff of *philosophers* again roamed the island in every direction, not seeking so much "whom they may devour," as what they could bag for natural history specimens, although "the pot" was not altogether lost sight of, as twenty brace of wild ducks were shot, and bushels of the cabbages* gathered by the men.

The next morning the ship left Christmas Harbour proceeding to the south-east, making observations of the numerous bays and headlands on her way. Passing Howe's Foreland (of Cook), and keeping outside the vast beds of weed passed through by that navigator, in the evening anchored in Betsy Cove, Accessible Bay, a snug and safe anchorage, but small for a ship of the 'Challenger's' size, much used by sealers and whalers for boiling down their blubber at, and from which process they call it "Pot Harbour." There were evidences of the place having been used for the purpose, and in a number of graves and rude monuments, a sadder evidence of the hazardous life of those who pursue sealing and whaling as their calling.

The 'Challenger' remained a week in Betsy Cove, and the time was made the best use of when the weather allowed. Sights were obtained for rating the chronomoters, and the place surveyed. A number of sea elephants were taken, and one, 12 feet in length and 9 feet in girth, was dissected and headed up in casks, to reappear some day, probably in the new Natural History buildings now erecting in South Kensington.

Whilst lying in Betsy Cove they were surprised one evening by the arrival of a schooner, of about 80 or 90 tons, the 'Emma Jane,' one of a small fleet belonging to an American whaling company. She reported that another of the Company's vessels, a barque named the 'Roman,' was in Accessible Bay. Two schooners are employed at Kerguelen Island, and one at Heard Island, in whaling and sealing, and the barque comes to the island in September, where she meets the two schooners, and the three proceed to Heard Island, and there remain during the sea elephant season, which lasts until the middle of December, and then return to Kerguelen, to fish for whales up to June. The barque takes the proceeds to the United States, returning again in September. The seamen are engaged for three years, and the barque brings a relief to a portion of them every year.

One of the most sad things connected with this sealing trade is the indiscriminate slaughter of the seals, old and young, for it is at the breeding season, when they land to breed and foster their young, that they are attacked; and although the large male seals are considered the best, as yielding most blubber, neither the clapmatches or the cubs are spared; and thus, like "killing the goose that laid the golden eggs," the seals are being gradually exterminated, and that, not from necessity or profit, but sheer wantonness and cruelty. Leaving Betsy Cove on the 16th the 'Challenger' encountered a heavy gale, and the next evening ran into Royal Sound, and anchored in Island Harbour; here they found the other schooner, the 'John Coalgate.'

Royal Sound is a magnificent bay on the south-east side of the island, running nearly 20 miles in from the sea. It is sheltered on the south by a range of mountains now called Wyville Thomson Range, with a fine volcanic peak rising as an enormous cone in the midst of a surrounding circlet of sugar-loaf peaks, to a height of 3160 feet above the level of the sea. To the west the towering snow-clad peak of Mount Ross, upwards of 6000 feet high, is seen rising in a continuous slope from the sea, and giving birth to numerous glaciers in the lower valleys. On the north is also the fine Crozier Range, 3250 feet high, named after Captain Francis R. M. Crozier, who commanded the second ship of Sir James Ross's expedition, and afterwards, in command of the same ship, perished in the ill-fated expedition of Sir John Franklin to the North Polar regions. "It is well and appropriately named," says one writer, "by Cook a *Royal* sound. He was always happy in his nomenclature of newly-discovered land, and probably when calling it 'Royal,' as being between the capes he named after the King (George) and the Prince of Wales (Prince of Wales Foreland), saw the fitness of the name in another sense."

There are hot springs at the sound on the low neck of land which forms the isthmus between Royal Sound and Swain Bay. The bay is studded with islands. Island Harbour, being formed by three of them, is a beautifully secluded land-locked spot, and much used by the whalers, as the presence of two huts and a number of barrels testified. There was also the same evidence of the precarious nature of the whale-fisher's life in about a dozen more of the same kind of memorial slabs as were found at Betsy Cove.

On the morning of the 19th the 'Challenger' steamed to the head of the sound, which is surrounded by high hills. A party landed and obtained fifty brace of ducks; and as the weather was favourable, surveying, dredging, and other collective operations were prosecuted with vigour, including the obtaining of several photographic negatives of the beautiful scenery. Proceeding from Royal Sound on the 21st, on rounding Cape George they were met by a westerly wind, misty weather, and a heavy swell, which caused them to turn back and seek an anchorage in Greenland Harbour, immediately east of the cape, an excellent harbour with westerly or northerly winds, but exposed to the south-east.

On the 22nd January the 'Challenger' left Greenland Harbour, and having reached almost the extreme south of the island, it was decided to return to the northward, and in doing so had a fine fair wind while passing up the east side of the island; but after passing Cape Sandwich had a dead beat to windward. The next day a heavy sea struck the ship and stove in one of the bow ports, at the same time washing away a part of the head and the foremost sounding platform.

On the 24th the weather moderated, and when the haze cleared, the high land of Mount Campbell was made. By the evening they were enabled to get into Cascade Harbour, where they anchored for the night; but instead of being able to proceed towards Christmas Harbour the next day it was as much as could be done to get into the safe anchorage of Betsy Cove.

January the 26th, the 'Challenger' left Betsy Cove and beat along the coast to the north-west against a strong head-wind, and anchored for the night under Howe Island, and the next morning, steaming through

* The seed of this plant has germinated in the Royal Gardens at Kew.

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Aldrich Channel, got safely into Christmas Harbour. There surveying was resumed, and as much completed as time and weather would permit. Sights were obtained, and a notice of the proceedings of the ship, with remarks upon the weather experienced, for the information of the observers of the Transit of Venus, deposited in the cairn, on the north-east point of the harbour.

On the 31st Christmas Harbour was again left, and with a strong breeze the ship passed rapidly along the land, and succeeded in passing Cape George to the south point of the island, which was called Cape Challenger. During the afternoon the wind and sea increased too much to admit of getting into Swain Bay, without great loss of time and coal, so without delay they bade adieu to Kerguelen Island, and bore away for Heard Island.

Captain Nares, in giving names to the various islands, capes, mountains, &c., with a thoughtfulness that does him honour, did not overlook those that had preceded him in visiting Kerguelen Island, and the name of every officer that accompanied Sir James Ross in his voyage towards the South Pole will be found affixed to one portion or another of his survey.

On the 2nd February, being midway between Kerguelen and Heard Islands, sounding was had in 150 fathoms, and twice during the following night less than 100 fathoms was found, at other times finding no bottom in 220 and 425 fathoms, thus showing the irregularity of the ground. Light airs with thick fogs prevented the land being made until the morning of the 6th, when Meyer's Rock and McDonald Island were sighted, and soon after Heard Island was seen to the eastward. In the afternoon the 'Challenger' anchored in Corinthian Bay.

Some little confusion exists as to the first discoverer of this group of islands, for owing to the development of the theory of Great Circle sailing, by Captain Towson, in 1847, a number of vessels took the shorter route of a high southern latitude in passing from the Cape of Good Hope to Australia, instead of running round the globe in a parallel of latitude. In the years 1853 and 1854 various accounts were given of the discovery, but it is believed to be really due to Captain Heard, of the United States ship 'Oriental,' of Boston, who saw the group in November 1853, and two months afterwards, Captain McDonald, of the ship 'Samarang,' saw them, and they have since, very properly, retained the names of the two captains.

This group lies 240 miles from Kerguelen Island, or just below the 53rd degree of latitude, and between 72½° and 74° east longitude. McDonald Island, the westernmost, is a large block of barren rock only 1¼ mile long and half a mile broad; it rises 630 feet above the sea. To the north-west, at a distance of little more than a mile, is Meyer's Rock, rising precipitously to a height of 450 feet. Heard Island, 25 miles east (true) from McDonald Island, is 25 miles long and about 7 miles broad. Having no deep bays, it possesses no protection for ships in the usual westerly gales and swell of these latitudes. The mountains near the centre are said to rise about 6000 feet above the sea, and are covered with eternal ice and snow, from which two enormous glaciers extend, the spurs of which, even in summer, extend to the beach on the south side of the island, but do not reach the water on the north-east side except in Corinthian Bay.

As the 'Challenger' passed the north end of the island, Red Island, a round block of dark red lava, about 200 feet high, showed very conspicuously. It is readily distinguished by its colour, and lies half a mile from the shore of Heard Island; there is no passage between. A mile south of Red Island on the mainland is a high, square, black precipitous cliff, too steep for the snow to lie upon, and therefore always showing conspicuously. Soon after, the double peaked foreland, called by the sealers *Roger's Head*, opened out; it is 500 feet high and connected by a low neck. A square-topped black hill, about 400 feet high, called Saddle Peak, was seen appearing like an island. Each point of the coast is well marked by its black headland, and each bay or indentation by its one or more glaciers. The base of the one at the anchorage in Corinthian Bay, being exposed to the drifting black lava, is of a dirty light brown colour, the others a very beautiful transparent pale blue merging into white. On the sides of the hills separating the different ice streams, are ridges of black land formed into morasses by the *débris* carried down by the glaciers. The surface of the land near the north-east end of the island, must be very uneven as the glacier is very much broken, forming numerous crevasses.

Corinthian Bay lies immediately to the south-east of Roger's Head, and is readily distinguished by that headland. The squalls on rounding it were very violent off the land until the bay was opened, when the wind became steady, blowing from the westward across the isthmus. The 'Challenger' anchored in 10 fathoms water. On the west shore of the bay the land slopes down from the high peak of Roger's Head, wonderfully marked by its numerous thin layers of lava, overlying one another. Towards the head of the bay is a low level isthmus composed of washed up gravel and sand, which separates Corinthian Bay from Atlas Cove to the westward, and from the south-west bay on the opposite side of the island a passage for the sea had evidently once existed here. A line of low black lava cliffs, in the holes of which Cape pigeons build their nests, border the west shore of the bay and prevents landing. At the head of the bay is a low, black, sandy beach, on which the sea constantly breaks; but the sealers state that it is smooth enough to effect a landing on an average one day in three. The beach is so low that with a heavy sea it runs, breaking, some distance in shore at high water.

At the east end the beach is joined by the precipitous face of a glacier 50 or 60 feet high, which extends to Saddle Point, and prevents communication along the shore. But from Mechanics Bay to the south-eastward there is a track along the beach to the south point of the island, which allows communication without the necessity of crossing any of the glaciers.

The numerous streams from the foot of the melting glacier render the ground on the isthmus very boggy; they unite into a considerable stream, and enter the sea at the extreme west end of the beach, discolouring the water to a distance of a quarter of a mile, the muddy stream being distinctly seen in the blue sea water.

The mountain at the north-west end of the island has two peaks, both lower than the single peak in the middle of the island, which the sealers call Big Ben.

A party of sealers were found in Corinthian Bay, and another party was at the south point of the island, all

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engaged in capturing sea elephants, the blubber of which is melted down, and the oil stored in casks, tanks, &c. The men at Corinthian Bay lived in two hermetically closed huts, sunk in the black lava ground, for warmth, and for protection against the strong westerly winds which blow with increased force between the two mountains as through a funnel. To visit them the party had to ford the stream, the water running over the tops of the knee-boots. These men work for the same owners as the whaling schooners seen at Kerguelen Island; they are left here in December, and return to Kerguelen the following August to meet the barque with stores from the United States. They appeared contented with their lot. The principal men are Americans; but some of the crew were Portuguese from the Azores and Cape Verde Islands. Their life is a hard one, and very monotonous, and not over lucrative, for they consider themselves fortunate if, at the end of their three years' term, they return home with 50*l.* in their pocket; and, as is too often the case with sailors, after their life of restraint, privation, and danger, they run into the opposite extreme of reckless unthrift and dissipation, so that at the end of the two months the ship is refitting, their money is gone, and being penniless, they return to those truly desolate regions for another term of banishment; but their exile being voluntary, they do not apparently seem to feel their complete isolation from the world.

Kerguelen Island and Heard Island appear to have totally different climates, and to be visited by different winds. Near Heard Island south-east winds were experienced, with thick fog for three days, and the sealers stated that it frequently blew from that quarter, which at Kerguelen from this direction is unknown; and from this circumstance, together with the testimony of the sealers to the inferior character of the weather at Heard Island, Captain Nares came to the conclusion that it was an unfavourable station for observing the transit of Venus, and recommended two positions being taken at Kerguelen Island, in preference to one party being detached at Heard Island. Like other places it occasionally has a period of fine weather, and the sealers agree that they get more in December than in any other month, when the northerly and easterly winds are not so prevalent as at other seasons, and that clear weather is often enjoyed for several days together. Should, however, it be decided that one of the astronomical stations should be at Heard Island, there is nothing to prevent a party being landed, but the ship could not remain to attend upon them. The best landing-place and also the best position for the station would be in Mechanics Bay, the indentation on the north-east coast, immediately south-east of Corinthian Bay.

The temperature, during the stay of the 'Challenger,' ranged between 39° and 36°, which was also the temperature of the surface-water; it may therefore be considered a correct indication of the mean for the time of the year.

The cabbage-plant of Kerguelen was also found at Heard Island, but of smaller growth. No ducks were found.

There is little or no kelp about the island: doubtless the great quantity of fresh water continuously running into the sea during the summer from the glaciers accounts for this.

Northward of the island 6 or 7 miles are two large rocks, called Sail Rock and Shag Rock. As far as could be ascertained through the mist, the latter was about 200 feet high, and a quarter of a mile in diameter, and Sail Rock a small pinnacle 50 feet high.

The sea elephants are found in considerable numbers, and afford constant employment for the party stationed here. One of the beaches on which these animals congregate cannot be approached by a boat, and if killed, the bodies cannot be removed by land. With a view of causing them to land and be killed on more eligible spots, the poor creatures are whipped into the sea again; but some of the oldest and largest are impervious to the whip, and will not move off to be killed in another place, even though the whip be turned into a club. These stubborn animals are known to the sealers as "beach roamers," and are left to their fate to die as they like.

Captain Nares intended remaining a day or two for the purpose of examining the island and fixing positions, but the barometer was falling so rapidly that it was not prudent to delay, and, on the morning of the 7th, put to sea. No sooner had the ship rounded the north end of the island, than a northerly gale broke on her with great fury. Knowing that the gale would be accompanied by thick weather, Captain Nares did not venture to pass to the eastward of the south-east point, as all the sealers were agreed in the information that a shoal spit extended from it many miles to sea. By midnight it was blowing a very hard gale, the ship under treble-reefed topsails and reefed courses, running fast to the southward; but the wind and sea increased so much that the ship was laid-to.

Early on the morning of the 8th of February a heavy sea struck the ship and stove in the two foremost ports on the main deck, floating everything out of the sick-bay; but beyond this no damage was done, and the day broke with decreasing wind and a bright, beautiful day.

The first Antarctic iceberg was met on the 11th of February in latitude 60° 52′. It was 200 feet high, and about 700 feet long. On the following day another was seen, and the ship's course altered to pass near it, this bringing all hands on deck to enjoy the novel and beautiful sight. The rich cobalt blue tints blending with the white of the ice, with the sea dashing against it, produced a fine bit of colouring. After this the icebergs became more numerous, and of course the novelty wore off. On this day they sounded in 1250 fathoms, and had a most satisfactory haul with trawl.

In a fog, during the night of the 18th, the ship ran into pack-ice, but fortunately the wind enabled her to force her way out again, and she *hove to* for the night. The next morning, in latitude 65° 42′ S., longitude 79° 49′ E., the ship was close to the edge of a dense pack, through which no lanes of water could be seen from the masthead: sounding was obtained in 1675 fathoms, and the dredge was hauled. The surroundings of the ship were now another novelty, creating great interest: on one side of the horizon a boundless field of ice and numerous icebergs about. The birds about the ship had changed except the Cape pigeon *(Pintado capensis)*; among the new ones were the beautiful little stormy petrel. The Cape pigeons were frequently observed roosting in the snow on the top of the icebergs.

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The fine weather continued until the 16th, when the Antarctic circle was crossed in longitude 78° 22′ E.; the ship having followed the western edge of the pack to the southward for 150 miles, it now turned to the north-east.

The next two days the 'Challenger' pursued her way to the eastward towards "Wilkes's farthest," and the north end of the pack was rounded. On the 18th they experienced some heavy falls of snow, and at midnight the thermometer had fallen to 22°. The following day sounding was obtained in 1800 fathoms, and on the 20th no fewer than seventy-eight icebergs were seen from the deck. Much has been said of the necessity of our steam vessels, in making for the United States, taking frequent observations of the temperature of the surface-water in dark or thick weather and fogs, as a cautionary measure for prevention of accidents in running into or against icebergs; but it is extremely doubtful to what extent an iceberg will affect the temperature of the neighbouring sea, and unless such observations on the temperature are incessant, the ship, between taking one and another, might be lost. From the observations made in the 'Challenger,' they do not appear to affect the temperature of the water in their vicinity, but on approaching the pack, where the surface of the water was covered with ice for many miles, there was a sensible diminution in the temperature of the surface water, the difference being gradual as the pack is approached, to as much as five and six degrees.

On the 21st of February the day was very fine and calm; steam was got up, and the ship taken near a berg about 180 feet high. After photographing it, two shots were fired into it from the 12-pounder gun—the first, from a distance of about 30 yards, brought down a great quantity of ice in slabs; the other from a greater distance aimed at about a quarter the distance from the summit, buried itself in the ice. In the evening a fine aurora was seen, lighting up all the icebergs around. A course was shaped for Termination Land.

On the evening of the 23rd, in latitude 64° 18′ S., longitude 94° 47′ E., the pack was again met with. This position was 20 miles from "Termination Land," as depicted on the charts by Wilkes, who, although describing it as an appearance of land at a distance of 60 miles, did not note it in his chart as such, but inserted it as land; and as the 'Challenger' was so much nearer the assigned position, than the American discoverer, and with clear weather, it must be assumed that there is no land where he supposed it to be. It is much to be regretted that that officer did not on his chart content himself with recording the doubt expressed in his description.

The next day the wind increased considerably, with thick dirty weather, and so suddenly did this come on that, when in the act of lowering the dredge, operations had to be suspended and the dredge hove in again. The ship was taken up under the lee of an iceberg, and whilst in that position handing the fore-topsail, a sudden lull in the wind, or eddy current, occurred; the ship, gaining head-way, went bows on to the ice carrying away the jib-boom, dolphin-striker and starboard whisker, but without doing injury to the ship. By steaming astern it was cleared. Towards noon the wind had freshened to a hard gale from the southward with very heavy squalls and falls of snow, so thick indeed, that in no direction could the length of the ship be seen—a most anxious time, knowing that icebergs must be in the vicinity on every side. A good look-out was kept, and at 2.30 P.M., during the heaviest part of the gale, a large iceberg was seen looming through the mist directly to leeward. As the ship was drifting immediately upon it, and there being no room to steam ahead, by a manœuvre seldom practised in seamanship, the main-topsail was backed, and with the engines full speed astern, the ship fortunately gathered stern-way and just managed to clear it. Had it not been for the steam, it cannot be doubted that the ship and berg must have come into contact. After getting to leeward they endeavoured to use the iceberg as a breakwater; but the gale was blowing too hard for the ship to be brought head to wind, and she was obliged to be allowed to drift. In the evening the weather cleared slightly, and during a momentary lull, under the lee of another berg, the ship was brought round on the other tack. As the distance between the two bergs was now known to be clear, the night was spent in drifting backwards and forwards between them with a tolerable feeling of security.

The following morning the weather cleared up, and the pack being open the ship was run some distance within the edge to within about 15 miles of "Termination Land," and again, with clear weather, nothing was to be seen. At noon the edge of the pack turned to the eastward, and then with a fine southerly breeze the pack was soon left behind.

On the 26th, sounded in 1975 fathoms, the deepest water found since leaving the Cape: yellowish mud bottom, and then dredged again. The wind increased to a gale, and the same period of anxiety would have had to be passed, but for (this time) the friendly aid of a very large iceberg which enabled them, by means of steam, to sustain a position under its lee throughout the night. The next morning at daylight the 'Challenger' bore up for Australia before a strong, favouring gale, every one after the experience of but a few days heartily glad to be leaving a part fraught with so many dangers, and they could fully realize the feelings of the purser of the 'Vincennes', when asked by his commander to express his official opinion as to the expediency of continuing the exploration, he answered that he "could not understand the utility of proceeding when there was so great a probability of no one living to carry home the tale."

The last iceberg seen was on the 4th March, in lat. 53° 17′ S., long. 109° 23′ E. These icebergs of the southern regions—unlike those of the Arctic Seas, which present so many fantastic shapes, and which to a lively imagination represent ancient castles, cathedrals with cloistered aisles, churchyards, &c.—are very tame, nearly all presenting the same table-topped or twelfth-cake appearance, divested of all coloured ornaments. They are usually from a quarter to half a mile across, and 150 to 250 feet above water. As the temperature of both air and water in the southern seas, even in summer, is below the melting-point of fresh-water ice, of which the bergs are composed, it is evident that they can dissolve but very slowly.

Westward of longitude 80° E. but few icebergs were fallen in with, but to the eastward of 92° they were very numerous, and continued so to the eastward, even when at a distance from the pack. Their absence to the westward between 70° and 80° E. longitude,

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except where close to the pack edge, was so marked, that coupled with their absence in the same meridians in lower latitudes, as exemplified by the ice-chart, which records all the positions in which icebergs have been seen, leads to the conclusion that there can be no land for a considerable distance to the south in those meridians, and that a high latitude could be attained in that direction, if desired.

The pack-ice found consisted of small salt-water ice-pieces that could not be called floes, from 30 to 50 feet in diameter. The single season's ice was about 3 feet in thickness, and the hummocky ice, formed by several layers heaped one upon another, and frozen compactly together, was from 7 to 8 feet thick, the upper surface of each piece being covered by a layer of snow about a foot thick. Scattered about in the pack were a few blue coloured bergs, pieces of all sizes being frozen into the salt-water ice. The latter was much honey-combed by melting, but of sufficient strength to be dangerous to a ship's side if brought in contact. A properly fortified ship would have made way through most of what was seen, but it certainly did not deserve the name of "barrier," given to it by "Wilkes."

When at the pack-edge the temperature of the water was always between 28° and 29°, just sufficiently warm to melt salt-water ice slowly, but to have no effect on the fresh-water berg pieces. At a short distance from the pack the surface water was 32°, but at a depth of 40 fathoms a temperature of 29° was always found; this continued to 300 fathoms, the depth to which the generality of the icebergs float, after which there is a stratum of slightly warmer water of 33° and 34°.

As the thermometers had to pass through these two belts of water before reaching the bottom, the indices registered those temperatures, and it was impossible to obtain the exact temperature of the bottom whilst near the ice.

Whilst in the neighbourhood of the ice, the temperature of the air ranged between 34.8° and 21.5°, the mean being 31.5°, a slightly colder climate at that time of the year, in an average latitude of 64° S., than is found in the month of August in the Arctic regions in latitude 74° N.

A great number of fin-backed whales were seen, but very few sperm whales. Strange to say, although Ross found seals and sea elephants in this and much higher latitudes, none were seen by the 'Challenger.'

On the 17th of March the 'Challenger' arrived at Melbourne, the voyagers glad once more to hear the cable rattling through the hawse-holes, and all well on board. At Melbourne they found the German training-frigate 'Arcona'; she also had, on her way from Europe, touched at Kerguelen Island, and anchored in Christmas Harbour, where they had discovered the cairn erected by the 'Challenger,' and had copied Captain Nares's instructions, re-depositing the document when they had done so.

It will be observed in these notes of the voyage of the 'Challenger,' that the author studiously abstains from advancing any abstract opinion of his own; he considers that he would not be justified in commenting too freely on the facts related, so as to in any way forestall or anticipate conclusions which it will be the duty of those who are bearing the "heat and burden of the day," to work out. J. E. DAVIS.

FORMOSA.

THE occupation of Southern Formosa by a Japanese military force has brought that island prominently before the public, and as handbooks and year-books devote but little space to an elucidation of its geography, our readers may be glad to have placed before them a somewhat more ample account, together with a map compiled from the best authorities.

Formosa—called Tai-wan by the Chinese, and Pakan by its natives—lies off the coast of China, from which it is separated by the Formosa strait, a much frequented highroad for vessels proceeding to the ports of Northern China, and about 100 miles wide. Formosa, from Siauki Point, in latitude 25° 18½′ N., to the Nan Sha or South Cape, in latitude 21° 54½′ N., is 245 miles in length; its width varies, but nowhere exceeds 80 miles, and its area is 13,100 square statute miles. It is thus about half as large as Ireland, and somewhat larger than Sicily.

The Chinese must have known of the existence of this island at a very early date, though they only refer to it as the country of the Tung-fan, or Eastern barbarians during the reign of the dynasty of the Yuen (1278-1368). Subsequently it became known as Kelung, from one of the northern ports, which had received a colony. The Spanish discoverer, charmed with its luxuriant vegetation, bestowed upon it the name of "Formosa"—"the Beautiful," which it retains to the present day amongst the seafaring nations of Europe. The Spaniards built a fort on an island in Kelung harbours, the remains of which may still be traced. Their occupation, however, was of short duration. Their successors, the Dutch, established their factories on the west coast, and retained possession of the country for a space of thirty-seven years, from 1624-1662. The Chinese population, owing to the irruption of the Manju, increased considerably during that period, and the Dutch were finally compelled to relinquish this fine possession—much to the regret of their old historians. The Chinese immigrants at first governed themselves; but, in 1682, they submitted to the Court of Peking. Mandarins were sent, Taiwan-fu, the present capital, was founded, and the island placed under the Governor-General of Fukien, its chief magistrate being, however, permitted to report direct to Peking.

A chain of lofty mountains traverses the island from north to south, and divides it into two portions, having distinct physical features, that to the west being a low land, only rising occasionally into hills, that on the east being mountainous and difficult of access. The central mountain chain, called Ta-shan, or "big mountain," by the Chinese, attains its culminating point in Mount Morrison (Mu-kang-shan), which rises to an elevation of 12,850 feet, and is said to be covered with snow during the greater part of the year. There are other peaks not far inferior to it in height, and amongst these one of the most prominent is Mount Sylvia (Shan-chao-shan, 11,300 feet). The mountains are probably of volcanic origin, but sedimentary rocks, including slates, limestone, and sandstone, are also met with. Active volcanoes are not known to occur, though the existence of solfateras near Tamsuy, and the reported occurrence of submarine eruptions near the coast, seem to indicate that volcanic activity has not been long extinct. The

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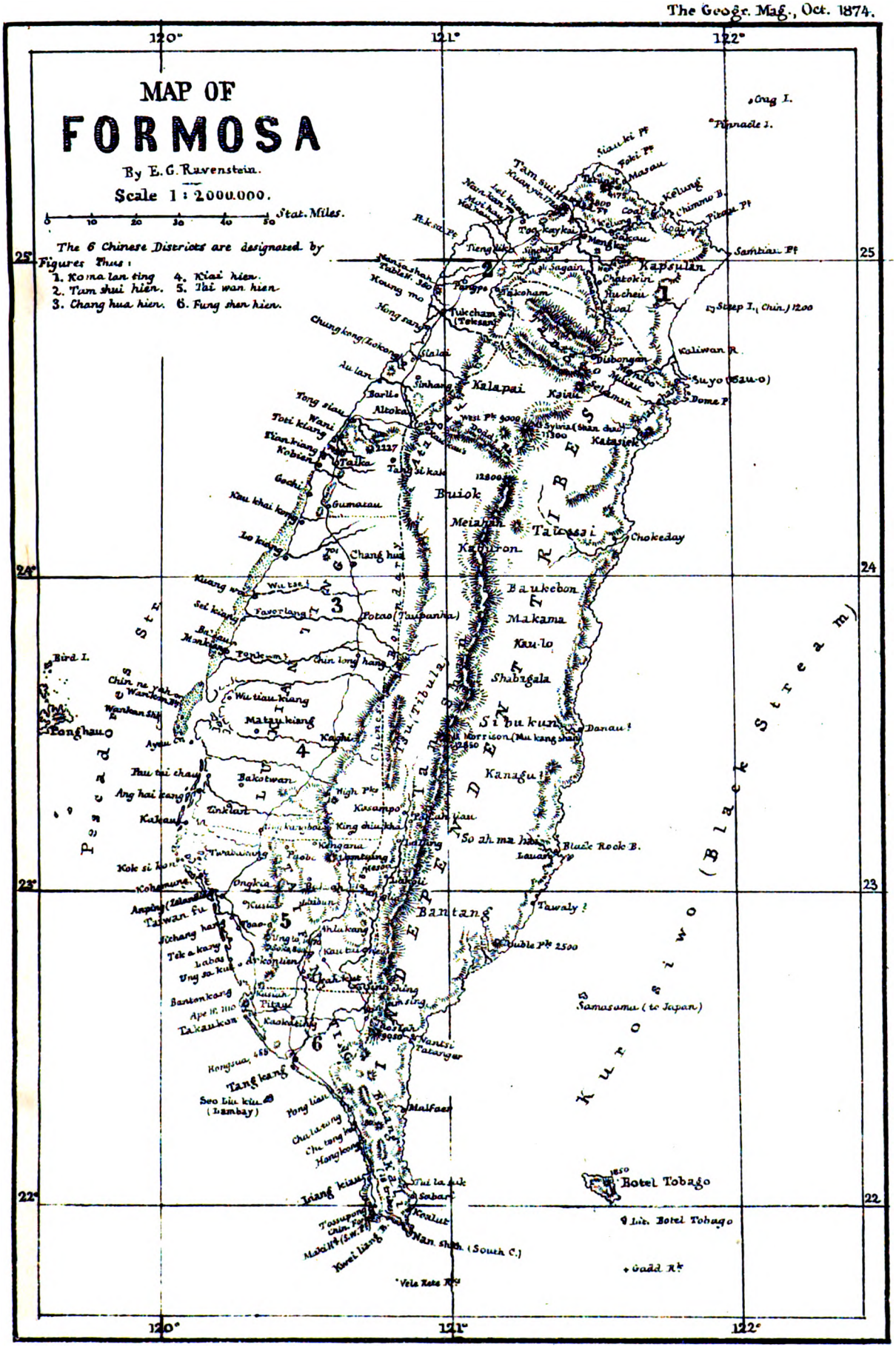

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"fires," however, which have been observed to rise from the ground in various parts of the island, are not ascribable to volcanic agency, but are due to the ignition of vapours arising from petroleum springs, or to burning coal-beds. The mountainous region extends down to the east coast, which, in many places, rises almost perpendicularly from the sea, and is covered almost throughout with most luxuriant primeval forests —the last refuge of the numerous small tribes who have not as yet submitted to the authority of the Chinese. The western half of the island presents an aspect altogether different. The trees have almost entirely disappeared. The wide plains and undulating hills are in a high state of cultivation, and maintain a teeming population. Numerous farms and villages, surrounded by groves of bamboo, bananas and areca palms, meet the eye; creaking bullock carts creep along the hedged-in roads; travellers are being conveyed in sedan-chairs, and the whole region is instinct with life and industry. A large portion of the plain has a sandy soil, and it is principally in the valleys, where a fertile mould covers the gravel, that the most abundant harvests are obtained. The clay and limestone hills frequently support only a scanty herbage, and it requires the perseverance of the hardy Hakkas (natives of Northern China) to cultivate them successfully. The west coast, though superior in that respect to the east, possesses only one harbour accessible to European vessels drawing more than 12 feet of water, and capable of affording shelter to a fleet. This harbour is formed by the estuary of the Tamsui River, and is accessible at high water to vessels drawing from 17 to 22 feet. It affords a safe anchorage during the greater part of the year. Only in early summer, when the melting of the snows and the fall of heavy rain convert the Tamsui River into a mighty stream rushing out with great impetus, are vessels occasionally driven from their anchorage. At all the other harbours along the coast larger vessels are obliged to anchor off the land, and to discharge cargo in boats, an operation frequently rendered difficult by heavy surf. Navigation is moreover impeded by sandbanks and reefs. From the south-west point, as far as Pong-liau, the hills approach close to the shore, and are backed by the wooded inland range. But from that town, past Takau and Taiwan-fu, and as far as Gochi, a distance of 160 miles, the shore is a sandy beach, or it is girded by lines of sandbanks, or rather islands, from a quarter of a mile to half a mile broad, and intersected at frequent intervals by shallow channels, the depth of which but rarely exceed 7 feet. These sandbanks are occupied by a few fishermen, whose huts and bamboo rafts are the only relieving feature of this dreary scene. Standing on one of these sandbanks no vegetation is in sight, and the mainland of Formosa can only be seen in clear weather. The whole of the immediate space seems to be an intricate mass of sand and mud banks, intersected by shallow channels, with occasional patches of sedge. Further to the north, hills of moderate elevation approach the coast, and on either side of the Tamsui Harbour these hills attain a height of 1720 and 2800 feet respectively, thus serving as capital landmarks. The northern extremity of the island is again low, and a reef extends from it for a considerable distance.

There are numerous rivers, but only one of them, the Tamsui (Tang-shui-khi) appears to be navigable for any considerable distance into the interior. Its navigation, however, is impeded by rapids, which are cleverly shot in Chinese "rapid" boats.

The climate of Formosa is described as pleasant and salubrious, and the heat is tempered by the proximity of the mountains and by sea breezes. At Tamsui, in the north, rain and clouds, brought by the north-easterly winds blowing over the warm Kurosiwo current, are the order of the day from the end of November to the beginning of May. At Takau the weather is most pleasant during the north-east monsoons (October to May), when the temperature rises but rarely above 92° Fahrenheit. In summer heavy rains fall near the coast only for a week or two, but a few miles inland it rains and thunders every afternoon from July to September.

The population of the island has been estimated at 3,000,000 souls, which would give 229 to the square mile. But as only about 6250 square miles of the island are in the possession of the Chinese, and the independent native population is not supposed to exceed 20,000 souls, the density in the Chinese portion would amount to 480, which far exceeds that of any European country of equal extent, and is surpassed only by five out of the eighteen provinces of China Proper. Taking all circumstances into consideration, and especially the absence of those colossal towns which swell the population of China and of our own manufacturing districts, we feel inclined to believe that the population of Formosa does not exceed a million and a half.

The population consists of three elements, viz., Chinese, tributary or "civilized" aborigines, and independent aborigines. Of these the Chinese, who have immigrated from nearly every province of the empire, occupy the foremost rank. They constitute the bulk of the town populations, and, aided by the subjected aborigines, they have brought under cultivation nearly one-half of the entire island. They are still extending themselves, and along the frontiers separating the immigrant from the aboriginal race constant warfare is the order of the day; the husbandman goes into the field armed, and the trader attends the place of barter attended by a body of matchlock men. Hostile encounters, frequently brought about by the Chinese taking forcible possession of fertile valleys or camphor-yielding mountain tracks, are frequent, and generally attended with the loss of human life. Every Chinese frontier village is stated to lose in this manner from 50 to 100 heads every year, and even if the losses of the aborigines are less numerous, they must, owing to their numerical inferiority, finally lead to the extermination of the race.

The tributary aborigines (Pepo-hoans) either live amongst the Chinese or occupy entire districts in the interior of the country. They have adopted to some extent the dress and manners of the Chinese. They have given up tattooing, shave the head, and wear pigtails; but, together with some of the better qualities of their conquerors they have adopted some of their vices. Marriages between the two races are frequent. Most of the converts of the English Presbyterian Mission, established on the island in 1865, have been made amongst the Pepo-hoans. The missions connected with Takau and Taiwan-fu boasted, in the beginning of 1873, of 784 church members, and

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of an average attendance of 1980 at the places of worship. No less than 282 adults and children were baptised in 1872, and the churches are partly maintained from the contributions of native members. In 1872 the Missionary Society extended its sphere of operations to Tamsui. In addition to this Protestant Mission there is one of Roman Catholics, conducted by Spanish Dominicans.

Before proceeding to give a description of the independent hill tribes, we will give a short account of the principal towns held by the Chinese, beginning near the southern extremity of the island, and gradually working our way up northward, along the coast. *Liang-Kiau* (Chiah-siang), the southernmost settlement of the Chinese (latitude 22° 5′ N.), is surrounded by a wall and a ditch, and has about 1000 inhabitants. The bay near which it is situated is open to westerly winds, but affords safe anchorage during the north-east monsoons. *Hong-kong* is a large Chinese village surrounded by wooded hills. Its inhabitants still pay a tribute to the savages for being allowed to cultivate their fields peaceably. Much fire-wood is brought to the place on bullock carts from the interior. *Tang-kang*, near the mouth of a considerable river, is said to have 20,000 inhabitants. *Takau* (latitude 22° 36′ N., longitude 120° 17′ E.) owes its importance to the fact of the harbour of Taiwan-fu not being accessible during the south-west monsoons. It is built at the entrance of a shallow lagoon, Ape-hill (1110 feet) constituting an excellent landmark; but apart from its increasing trade and the existence of a number of European houses, it is a place of no significance. The harbour may be entered by vessels drawing less than 12 feet: it affords safe anchorage, and might be converted into a capital port at a small expense. About 6 miles to the east of Takau, the road leading through a well cultivated plain, *Pitau*, the capital of the Fung-shan district, and a town of some importance, is reached. *Taiwan-fu* (latitude 22° 59′ N., longitude 120° 12′ W.), the capital of the island, is surrounded by a quadrangular battlemented wall, having a circumference of 6 miles. The houses of the mandarins, those of the principal citizens, and numerous temples, as well as extensive gardens and fields are enclosed by this wall. The streets are paved with brick, and the shops are well supplied. The population is variously estimated at 50,000, 70,000 or, 100,000 inhabitants, but the streets are silent, and in consequence of the gradual shoaling of the harbour its former prosperity appears to have departed from the place. When first founded the sea almost washed the walls of the town. It is now separated from it by a strip of sand, 2 miles wide, and the spacious harbour in which the invading Chinese anchored their fleet, can now be crossed without wetting a foot. The European custom house and a Chinese village, Anping-kong, are close to the old Dutch fort Zelandia, about 2 miles below the town. European vessels can only approach within 2 miles of the land, and are obliged to discharge their cargoes in boats. The anchorage, moreover, is safe only from December to March. The silversmiths of Taiwan are celebrated for their fine filigree work. *Kok-si-kong* (latitude 23° 5′ N.) is a small harbour, accessible to vessels drawing 12 feet. *Chang-hua-hien* (latitude 24° 2′ N.), a walled inland town of great importance, owes its prosperity to the vicinity of camphor-woods, the produce of which is exported in native junks through *Gochi*, a small seaport place in latitude 24° 16′ N. Tong-sian and Chung-kong (or Lo-kong), two small ports further north, likewise owe their importance to the export of camphor, which is procured at the foot of the hills, about 15 miles inland, where bituminous coal and petroleum are likewise found. *Hong-sang* (in latitude 24° 47′ N.) appears to be the port of the important city of *Tukcham* (Tek-san), which is the residence of many wealthy Chinese, and carries on a brisk trade in rice and corn. The harbour of *Tang-shui* or *Tam-sui* is open to European shipping, and its trade has increased lately to a great extent owing to the proximity of coal-mines, tea plantations, and camphor forests. The name of the small place where the European traders are located (latitude 25° 11′ N., longitude 121° 28′ E.), appears to be Hanobai or Tang-fan-so (town of the eastern barbarians), Tang-shui merely applying to the port and river. About 10 miles above the harbour, the important town of Meng-ka (Banca) is reached. It lies in the midst of a well-cultivated plain, is supplied with good water from an aqueduct, constructed by the Chinese, in spite of the opposition of the savage natives, and numbers about 40,000 inhabitants. Most of the Chinese junks ascend to it to discharge their cargoes. Doubling the northern point of the island we reach *Kelung*, formerly called Peh-kiang, the northern port, in latitude 25° 9′ N., longitude 121° 48′ E. The town is walled, and numbers about 3000 inhabitants, who carry on a brisk trade in tea and coal. The harbour is extensive, but coral reefs abound, and the shelter is indifferent. Still further south is Sau-o (Su-yu), in latitude 24° 37′ N., longitude 121° 50′ E., the most southerly settlement on the east coast. It is a straggling town, with many brick houses and well-supplied shops. Its population is of a very mixed character, and is charged with being addicted to piracy. The harbour affords excellent shelter, even to large vessels.

We will now devote a few lines to the independent native tribes who occupy the whole of the mountain-region of Eastern Formosa:—

To the Chinese these savages are known as Chiu-hoan, raw savages—or Sang-fan, cannibals—an epithet, by the bye, which they do not appear to deserve. They are split up into a large number of tribes, numbering from fifty to a few hundred individuals each, and though constantly exposed to the encroachments of their western neighbours, the Chinese, they have not yet learnt that union gives strength, and the only confederacy known to exist among them is that of the Kalis, in Southern Formosa, where eighteen tribes, numbering altogether no more than 2500 souls, have voluntarily placed themselves under a common chieftain. The remaining tribes are almost constantly on the war trail, and when not engaged in raids upon Chinese territory they squabble amongst themselves.

In general features these natives bear a striking resemblance to the Malays. The many diversities observed amongst them, especially near the coast, where Mongol features are by no means rare, is easily explained by an infusion of Chinese blood. The similarity of language goes far to support this relationship, and the Abbé Favre, who has devoted some attention to this subject, is decidedly of opinion that the aborigines belong to the Polynesian race, that

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they peopled Formosa at a period anterior to that when Buddhism was introduced into the Indian Archipelago, and that since that time they have had little or no communication with their ancestral home. It is remarkable, too, that seventeen of the tribes of Northern Formosa should designate their language as Tayal, which recalls the Tagal spoken by the Malays of the Philippines. The aboriginal inhabitant of Formosa is generally described as tall, well-made, and robust, and physically the superior of the Chinese. They are described, moreover, as being cheerful, good-natured and honest. Murder and adultery are said by Guérin to be almost unknown amongst them, and theft is exceedingly rare. It cannot be denied, at the same time, that shipwrecked mariners, who fall into their hands are frequently killed; yet Europeans who have visited them in their native forests have invariably been treated with kindness.

The dress of the men is limited sometimes to a strip of calico wrapped round the loins, but the use of sleeveless jackets has become general, and a sort of blouse, reaching down to the ankles, is worn during cold weather. The arms consist of a short sword, stuck in a girdle, a spear, and a bow or matchlock. The ammunition for the latter is carried in a bag suspended to a chain or a string of beads worn over the shoulder. A steel, flint and tinder complete the equipment. The women wear tight-fitting jackets and a skirt reaching to the knees, both of calico, and the latter ornamented with a bright border of red or yellow. The hair is bound up with red silk and then twisted round the head, so as to form a double coronet. Sometimes it is ornamented with leaves or flowers, Both sexes are fond of necklaces of beads and bracelets, and they insert a circular piece of wood, flat like a pawn or a shell, into the lower lobes of the ears. The custom of tattooing is universal amongst the tribes hostile to the Chinese. After a lad has accompanied a raid against the Chinese he is tattooed on the forehead, and when he adds the first head of a Chinaman to the trophies of his native village, he is tattooed on the chin. Girls are tattooed on the forehead, married women on cheeks and lips likewise.

The structure of the houses varies in different parts of the island, but nowhere is much consideration shown for comfort. The northern tribes live in small villages, in the midst of the primeval forests. Their houses are square, have a wooden frame and a bamboo roof thatched with straw. They have doors and windows. Bedsteads made of bamboo occupy the corners of the single room. The fire-place merely consists of three stones, and a bamboo rack is placed above it, where the skins and horns are hung up to dry. Arms and hunting gear ornament the walls. Opposite to the dwelling-house a store is erected on pillars, and, in addition to provisions, the entire wealth of the proprietor, including strings of small counters made of fish-bone, and used as money, is kept there. Sweet potatoes, hemp, and Arabia papyfera are cultivated near the dwellings, and cereals at some distance away from them. Near each village, but hidden in a thicket, may be seen a wooden scaffolding, where the skulls of Chinamen slain in battle are piled up as trophies. The Tsu, in the centre of the island, are said to live in circular huts. In the south a different kind of dwelling is met with. Each settlement generally consists of a long pent-house, built of mud-bricks and thatched. The interior of this long building is partitioned off into separate tenements, of a large and a small room each, and separated by bamboo walls, plastered with mud. Light is admitted only through the door, and the rooms are very low. Their furniture merely consists of a rough plank serving as the common sleeping-place; but sometimes tables and benches are to be seen. Stag's frontlets are attached to the white-washed walls, and matchlocks, bamboo-pipes, and other articles of common use, are suspended to them. The few household utensils, frequently limited to a few Chinese rice-bowls, are piled up in a corner of the room. Sometimes a bamboo-screen runs along the entire length of the house, reaching up to the projecting roof, and thus forming a covered passage.

The chief occupation of the men consists in hunting and fishing. The household duties, as well as a large share of the tilling of the ground, is left to the women. Rice and sweet potatoes, with venison and pork, constitute the principal articles of food. A fermented liquor, made of sweet potatoes, and called Sam-shu, constitutes a favourite beverage, and both sexes are addicted to smoking tobacco, and chewing betel-nuts.

Marriage takes place at an early age. Monogamy is the rule, only some of the chiefs having more than one wife. Amongst some of the tribes it is customary to break out two or even four front teeth, to celebrate the nuptials. The birth of a child and harvesting are seasons of high festival. On these occasions feasting and Sam-shu libations are the order of the day, two men sometimes drinking simultaneously out of the same cup. On these occasions a fire is lit in the open air, and, men and women joining hands, they dance around it to a plaintive song. At first the dancers step out slowly, but by degrees the speed increases, until it becomes furious.

There appears to be no belief in a supreme being or in a future state, but superstition, for all this, is ripe. The flight of birds is used as an augury, and genii are supposed to appear to persons during their sleep in the disguise of deceased relatives, to tender good advice. Thomson observed a stunted pole, with a jar of water placed in front of it, which he took for a household god, and when Swinhoe was offered a cup of Sam-shu, the women presenting it were apparently reciting an incantation. The dead, in the north, are buried in a sitting posture beneath the bed upon which they expire, and their clothing, ornaments, some rice and venison are buried with them.

The head of each family enjoys much authority, and each village has a head-man, chosen amongst the members of the same family for generations. The influence of this latter, however, is merely personal, and depends upon wealth and brute strength.

The natives are supplied by the Chinese with fire-arms, powder, lead, pans, jars, cotton-stuffs, beads, &c., and receive in return hemp, mats, rice-paper, skins, and horns of animals, as well as the right of cultivating the valleys and destroying the camphor forests. Too frequently, however, the encounters between the two nations are of a hostile nature.

Nature has been bountiful to Formosa with respect to her natural productions, and tropical plants, as well as many others of more temperate regions, attain there a high degree of perfection. Rice, as in China, constitutes the principal article of food, and from its

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great productiveness, Formosa has been called the "granary of Fo-kien." There occur, however, years of drought (as in 1872), when rice has to be imported from the neighbouring mainland. Amongst other food-plants extensively cultivated, may be mentioned millet, maize, barley, wheat, sweet potatoes, and arum. Amongst fruits we may mention oranges, pine-apples, guavas, pomegranates, chestnuts, melons, and ok-que, a berry growing on a trailing vine, and converted into a jelly. Truffles abound in the forests; ginger, pepper, aloes, and ground-nuts, are obtained; jute and grass-cloth fibre (a species of hemp) form articles of export. The indigo of Formosa is famed for its bright and lasting tints, and manufactured grass-cloth is sent to the island to be dyed there. The cultivation of sugar-cane has assumed considerable dimensions, especially in the country around Taiwan-fu, where the art of refining the sugar is understood. No less than 123,823 tons of sugar were exported during 1869-72 in European vessels alone, or nearly 31,000 tons annually. The immense forests of the interior furnish timber of superior quality, and in a single timber-yard Swinhoe was able to collect forty-two different kinds of wood, which may now be seen at the Kew Museum. The tree most sought after is the gigantic *Laurus camphora*, which yields camphor, the manufacture of which frequently brings the Chinese into hostile collision with the aborigines, within whose territory alone this tree is to be found. Formerly the manufacture of camphor constituted a government monopoly, and its sale was farmed out to wealthy natives, who must have realised immense fortunes, for camphor, at the place of production, only cost $6 the pikul of 133 pounds, whilst at Hongkong it was sold for $28. The monopoly was abolished in 1868, but so many difficulties are placed in the way of the Chinese agents employed by the merchants as almost to be tantamount to a continuance of the monopoly. Mr. Colborne Baber estimates the quantity of camphor produced in the Tamsui district in 1872 at 13,200 pikuls, of which 10,281 pikuls were exported in foreign vessels; but this rate of production cannot be expected to continue for ever, as the old trees are being destroyed, and no young ones planted to take their place. Another product peculiar to Formosa is the so-called rice-paper, manufactured from the pith of the *Aralia papyrifera*, which grows wild in the hills. The pith is pared round and round with a sharp knife, the sheet is then moistened and flattened out, and cut into square pieces of suitable size. This paper is used in the manufacture of artificial flowers and for painting on.

The cultivation of the tea-plant has been introduced from China, and is rapidly on the increase, which is not to be wondered at, as an acre can be made to return 10*l.* without the cultivator being exposed to much risk. The country around Tamsui appears to be best adapted for growing tea, and the land is taken forcibly from the natives by the cultivators, who are supported by armed bands. The tea-brokers visit the various districts, and send their purchases down to Tamsui in "rapid" boats. In 1872 no less than 2,601,801 lbs. were exported in foreign vessels, or five times more than in 1868.

The domestic animals include oxen, horses, sheep, goats, pigs, and poultry. The oxen are used for riding, and by training them they learn to walk as fast as a horse. They also draw the cumbrous carts which bring the produce of the interior down to the coast. The prick-eared dogs of the natives are highly esteemed for hunting. Fish abound in the surrounding seas and in the rivers, and give remunerative employment to numerous fishermen, whose catamarans or rafts form a conspicuous feature along the coast. Amongst the wild animals there are wild hogs, deer, monkeys, pheasants and game in the western low lands, leopards, bears, wolves, and woodland birds in the mountain region. A venomous snake (python) is also occasionally met with.

The mineral riches of Formosa have hardly as yet been ascertained. Coal alone, and to some extent sulphur, are being explored, but copper and iron are said to exist likewise, and saltpetre has lately been discovered on the east coast. Coal has been discovered in several parts of the island, in the north near Kelung and along the Tamsui River, within 15 miles of the east coast, in latitude 24° 28′ N., and near Lakuli, in the south. The principal coal-fields, however, are those of Kelung and Tamsui, and they are being worked in a primitive style by Chinese, who live close to the pits in huts built of wood and straw. As many as 75,000 tons were raised in 1872, of which 40,231 tons were exported in foreign vessels. The supply, however, is capable of being increased considerably, if permission were to be given to open more pits and to introduce European machinery. The coal is a tertiary lignite, burns fast, and gives out much heat. It is excellent for household purposes, and fairly answers for steamers if mixed with some other kind. The price of coal at the pit's mouth varies from 13*s.* to 18*s.* per ton, according to quality, and a duty of 40 per cent. is levied upon it when exported. The necessity of supplying the Chinese navy with coal, and the high price of that article when imported from Europe, has lately attracted the attention of the Chinese authorities to Formosa, and this may ultimately lead to a great expansion of mining operations.

Sulphur deposits of great value exist in close proximity to the coal mines, between Kelung and Tamsui. Swinhoe, who visited one of these mines in 1857, thus describes it:—"Seen from a distance it appeared like a canker on the side of the grass-covered hill, which was fresh and green everywhere except in the immediate vicinity of the mine. The broad sulphur valley or chasm had everywhere a pale, sickly tint of yellow and red; and out of many of its numerous recesses hot steam gushed in jets with great force, like steam from an escape pipe of a high-pressure engine. In other spots small pools of sulphur were bubbling. At the bottom of the barren ravine rippled a foul rivulet, carrying off the sulphurous oozings from the ground. Within and round about this hollow the earth underfoot rumbled and groaned, and the air was so saturated with the exhalations of sulphur as to become extremely noisome and destructive, to insect life especially, of which we saw abundant proof in the numerous remains of beetles and butterflies scattered around." The Chinese Government has forbidden the working of these mines, even going the length of compelling the local authorities to import the sulphur required for the manufacture of powder from Amoy. Yet, when Swinhoe visited the spot he found it alive with workmen, who melted the sulphur in stoves, and whose employers had no doubt found means to render

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the mandarins blind to their proceedings. Up to the present time sulphur does not figure amongst the exports of the island.

Salt is obtained by evaporating sea-water, and forms an article of export. Petroleum, apparently of inferior quality, occurs at Tungshao, below Tamsui, and elsewhere.

The commerce of the island suffers from the absence of good harbours along the populous west coast, and of navigable rivers throughout the island, for even the river of Tamsui, which is the most considerable of all, is full of rapids, and can be navigated only by so-called "rapid" boats. Our information respecting exports and imports is limited to the harbours open to European commerce. These are Tamsui and its subsidiary port Kelung, in the north, and Taiwan-fu with Takau on the west coast. The value of the merchandise imported in foreign vessels at these places in 1870 to 1873 was as follows :—

	Taiwan-fu and Takau.		Tamsui and Kelung.	
	Imports.	Exports.	Imports.	Exports.
	£	£	£	£
1870	297,737	419,102	163,581	150,927
1871	364,421	396,888	225,512	165,817
1872	322,330	399,315	274,641	294,738
1873	308,614	305,595	—	—

This does not include the trade done by Chinese junks, which are able to penetrate into nearly every harbour of the island, nor does it include the import or export of treasure.

The following is a more detailed statement of the commercial movement in 1872. At Taiwan-fu and Takau, there was imported foreign produce to the value of 295,481*l.*, and Chinese produce to the value of 26,849*l.* Amongst the former, opium occupied the first rank, for no less than 2301 cwts. of that noxious drug, valued at 259,144*l.* were imported. Cotton piece goods (23,070 pieces, value 15,139*l.*) follow next. The exports amounted to 399,315*l.* and included sugar (748,597 cwts., value 379,891*l.*), turmeric (11,313 cwts., 6244*l.*), salt (39,341 cwt., 5963*l.*), ground-nut cakes and oil (11,441 cwts., 2338*l.*), longans (2687*l.*), sesamum seed, sharks' fins, camphor, &c. The imports at Tamsui and Kelung are of the same kind. They amounted in 1872 to 262,482*l.* for foreign, and 12,159*l.* for Chinese produce. Amongst the former there were 1667 cwts. of opium, valued at 216,363*l.*, 24,972 pieces of cotton goods valued at 17,946*l.*, and 3785 pieces of woollen goods valued at 12,920*l.* Amongst exports, tea (2,601,801 lbs., 216,440*l.*) holds the first rank; coal follows next (40,231 tons, 26,775*l.*), and then camphor (12,239 cwts., 23,633*l.*). The large increase in the export of tea, sugar, and coal, which has taken place during the last few years, and which has been attended by a corresponding increase in the import of British manufactured goods, augurs well for the future development of the Formosa trade.

In concluding this article it may be convenient to say a few words on the expedition directed against the island by the Government of Japan. Towards the close of 1871 a number of shipwrecked mariners from Liu-kiu, a group of islands belonging to Japan, were massacred in the South of Formosa. This, and other outrages, induced the Government of Japan to fit out a military expedition, which was placed under the command of General Saigo, and landed in May of the present year, in the neighbourhood of Liang-kiau, about 40 miles to the south of Ta-kau. The Chinese authorities offered no opposition to the landing of the troops, and their arrival was hailed with pleasure by the Chinese inhabitants of that part of the island, who looked upon them as welcome allies in their encounters with the natives. The Japanese have had several engagements with the natives, though not always, it would appear, with a decisive result, and their losses in the field were supplemented by others due to a malignant fever, which proved fatal in many cases. Whether this expedition originally took place with the consent of the Chinese Government or not, thus much appears certain that the latter is growing impatient at the protracted occupation of the southern part of Formosa. It is said that an arrangement has been arrived at in accordance with which the Japanese general will abstain from further hostilities, but choose his own time for evacuating the island. The Chinese are evidently actively engaged in the fitting out of a military expedition, but whether these preparations forebode a collision between the two most powerful empires of Eastern Asia, or some other event, the future alone can show.

E. G. Ravenstein.

IMPRESSIONS OF JAMAICA.

Chapter IV.—Faces at Blundle Hall.

Gayest of all the gay French bonnets, lightest and most voluminous of all the gauzy and silken *modes* assembled and met together in Kingston Parish Church on Sunday the 21st morning of that white hot month of January, 1866, were the bonnet and the dress of Miss Grant, sister of the excellent Mrs. Seacole, of Crimean popularity. To speak of Blundle Hall, and not to speak of Miss Grant, proprietress and tutelary genius thereof, is a piece of glaring reticence akin to mentioning Brighton Pavilion and at the same time ignoring George the Fourth. It would be like writing a treatise and leaving out the subject. Miss Grant was—we are talking in the past tense generally, but I am glad to know, on good and recent authority that there is a Miss Grant still, who moreover is still Miss Grant—was, and is, I say, a brown lady. She despised "niggers," and indignantly refused to entertain Soulougue, when that amiable ex-emperor fled from Hayti to Jamaica—he and his wife and daughter and Prime Minister, and maids of honour, and chamberlains and equerries, and "lords of the footman species," and all the coal-black court. I never knew a brown man or brown woman who did not with undisguised heartiness despise a "nigger." Nay, I scarcely ever met a nigger who, either directly or by implication, did not act on the pot-and-kettle principle of reviling his brother on the score of blackness. Before I had been a week in Jamaica, I had come to regard this very odd fellowship as a matter of course. Leaning out of my verandahed window at Blundle Hall, watching, as I often did watch, with mingled repugnance and admiration, the vultures sunning themselves on the shingled roofs of neighbouring houses, I heard a quarrel between two negresses, mother and daughter, in a small courtyard below. I think these women were of pure African race, whether creole or immigrant does not matter. They were disputing angrily the question of the

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younger lady's propriety of conduct towards the opposite sex; and I was not a little amused at finding that the frail fair one frankly admitted certain lapses from virtue, but that she was incensed past all control of indignation by the charge of having committed herself with "niggers." She passionately defied her mother to prove that she had ever been guilty of the least flirtation with men of "a worse colour" than herself; and, with curious logic, she supported her negative by many affirmatives, declaring as a proof of her never having encourged the advances of Quashee or Quacco, that her list of lovers included many brown and several white gentlemen. Of these last she spoke with peculiar emphasis of pride in the familiarity which, as she confessed, or rather boasted, had sprung up between herself and them. The notion of a black sweetheart was violently repugnant to the chaste mind of a lady who had been honoured with the endearments of British and Yankee sailors, or perhaps even of a blond steward or supercargo.

It was, as I have casually observed, a time of rather doubtful issues, for Jamaicans and Jamaica, when I was forming these Impressions of the beautiful island. Though it is no part of my present purpose to rip up that much vexed question of rights and wrongs, in the suppression of a certainly serious outbreak, and in the punishment meted to those who were adjudged most culpable, I do not know that all reference or allusion to the people I met in connection with the now historical Inquiry is *taboo*. One of the English officers who had taken a prominent part in those affairs which led to the appointment of a Royal Commission was Colonel Hobbs, of the 6th Regiment; and of him it may be said, as of many more well-intending gentlemen who wore Her Majesty's uniform, in either service, that he was unfortunate in being his own historian. Poor Colonel Hobbs could not keep his hand from pen, ink, and paper. Those letters of his writing, which, together with certain other epistles yet more inflated and ill-advised, found their way into English and American newspapers, were stronger in self-accusation than any evidence substantially brought against him. One of the first faces I saw at worthy Miss Grant's boarding-house of Blundle Hall, was the face of Colonel Hobbs. Pale and wistful, with flashing, restless dark eyes; gentle and kindly mouth, courageous without firmness, the teeth showing prominently in front under the black, drooping moustache; nose slightly aquiline; the countenance of this unhappy, though once most fortunate and gallant man, was one I am not likely to forget. After his call on me, at Kingston, I had many opportunities of hearing from the lips of Colonel Hobbs, the story of his share in the grave responsibility of those events which had made the previous autumn of 1865 for ever memorable in Jamaica. I do not dwell upon the painful and much debated theme. All I care now to remember of poor Hobbs, with whom I was the last to speak, before his tragic farewell to the world and its troubles, was his happiness at home with wife and children, his love of gardening, and of making gardeners of his soldiers; his playful moods that flashed brightly out of melancholic gloom, his vivid, soldierly reminiscences of "battles, sieges, fortunes he had passed," what time his name was familiar as that of the youngest full colonel in the British army. He was the man who, standing on the quay at Balaclava, when the troop-horses were literally eating each other's tails off, or falling dead from famine, asked the honest captain of a transport that had lain in harbour for weeks without discharging her freight, the demurrage due to her being 60*l.* a day—"What cargo is there in that ship?" and received for answer the astonishing word "Hay." Colonel Hobbs was a religious enthusiast; some said "monomaniac," who, when he was not teaching his men horticulture, was making them sing hymns. He was a man of quick sensibility, very excitable, and liable to almost feminine emotions; and it is hardly wonderful that his mind should have given way under the pressure of anxiety which increased as the official inquiry at Spanish Town proceeded. Some days before it had concluded, Colonel Hobbs was in the care of trusty keepers, for the physicians had pronounced him insane. When the Commission of Inquiry into the conduct of Governor Eyre and his co-operators had finished its work, and a fortnight after Mr. Russell Gurney and Mr. Maule had departed for England, it was arranged that Colonel Hobbs and his family should make the voyage; and they embarked on board the 'Tyne' steamer for St. Thomas. Being one of the passengers, I was requested by a friend who had not had an opportunity of taking a personal farewell of Mrs. Hobbs, to deliver a letter of adieux to that lady, and on the second day of our passage, when I was thinking how I should find means to give her the note—for she had not left her cabin—Colonel Hobbs came on deck. He was looking much better than I had expected to see him look, and I congratulated him on returning health, telling him I was sure he only needed change of scene and a few weeks of repose to restore him thoroughly. "That is what you all say," he answered. "It is what we all think," said I, and I referred to Mr. Roundell, who had expressed the same hope and belief, in shaking hands with the invalid, but a few moments before. Colonel Hobbs, though very despondent, was quite calm in manner, and rational in speech. He talked of his disappointed hopes, and gloomily bade me remember always that he was "the most ill-used man in the British army." He had once been accounted the most fortunate! "Speaking as a dying man," was a phrase he used. I understood it as applying to his state of health, and had no idea that he contemplated suicide. Presently he turned to descend the stairs of the saloon, and I, hastily supposing that he would presently meet his wife, thought of the note, and asked him to give it into her hands. He took it with an absent look and manner, and, to my very great embarrassment, began opening it. Though I knew perfectly well that the contents were no more than half-a-dozen lines of friendly God-speed to the voyagers, I repented my haste, and would have given all I had to recal the note to my own possession. It was too late; nor was the matter of any real importance, though at the moment I felt it to be so. Colonel Hobbs, having read the letter without seeming to give it any attention, for he was still harping in broken sentences on his troubles and the supposed injuries he had received, vastly increased my perplexity and dismay by tearing the paper into little bits. Then, bidding me good-bye, and shaking hands, as he repeated the injunction that I should never forget how wronged a man he had been, he went down a stair or two, but returned, to pick up the

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torn pieces of the note, and drop them coolly over the side. Then, without another word, he descended to his cabin on the lower deck. In less than a minute I heard the cry of "man overboard." The alarm was taken up from mouth to mouth; but strangely enough I never thought of Colonel Hobbs, till, looking aft, in the white wake of the steamer, and in the gleaming sunshine, I saw the pale face and black hair and beard of him who had too surely spoken to me "as a dying man." A boat was lowered, Mr. Stephen Dix, first officer of the 'Tyne,' taking command in what was a forlorn hope indeed; and for some time the men rowed backwards and forwards over the spot where the poor fellow had gone down. He had struck out with the instinct of a good swimmer—there were few better than he, as I knew well—but his mortal determination came back upon him with renewed force, as soon as he saw the boat manned to save him, and he sank like a plummet.

I have retold, in this short digression, the story which I bore sadly to England eight years ago; and I believe this is the first time I have publicly mentioned the little incident of the torn letter. It was agreed at the time, between the medical attendant and myself, that we should do best in keeping silence for a while on a subject that could but needlessly burthen a tragic narrative with a few sad details. Let me now ask my readers to accompany me back to Blundle Hall, where, in the early days of my visit to Jamaica, I met some old friends and made two or three new ones. Miss Grant's *clientèle* was largely augmented by naval officers, from any ship or ships that happened to be on the station; and, besides the flag-ship of Admiral Hope, the 'Aurora' frigate was in Kingston Harbour, much to my delight when I came thither. With the old ship I had a pleasant intimacy of long standing; and, though she had changed command since I first sailed on board her as the guest of Sir Leopold Mc Clintock, then her captain, nearly all the officers with whom I had cruised so merrily in the Baltic and North Sea were with her still; and as for Sir Leopold himself he was, as I have said in a previous chapter, commodore of the station. We had amateur theatricals during the stay of the 'Aurora' at Kingston! and the theatre in the great sandy desert of a square at the top of the town was crowded with brilliant but perspiring audiences, with whom Mr. Patrick F. Keelan, the surgeon, one of the best stage Irishmen since Power, was an especial favourite. "The world is so small" that travellers meet everywhere on its surface, with the most surprising frequency. Not only did I foregather unexpectedly with messmates whom I had last beheld in high latitudes, but almost every second man I met on the island was related in some manner to somebody living next door to me at home, or else over the way. The Postmaster-General was the uncle of some prosperous young London citizens of my acquaintance; and the likeness to his relations, both in features and voice, was so striking that I knew him instantly, before I heard his name or had been told that he was in Jamaica.

One morning as we sat at the breakfast-table in the front gallery of Blundle Hall, enjoying the sea-breeze, the cassava cakes, and the other delicacies proper to that early time of day, a notable addition was made to the pretty numerous body of Miss Grant's customers. Of three young gentlemen who entered the tavern or boarding-house together, one especially claimed attention by his unmistakeable look of *caste;* by which word I mean, not as is too frequently and very erroneously meant, rank or station, but race. No one could have failed to identify him as a son of the Duke of Argyll; and indeed he was the Marquis of Lorne, then about a year short of his majority, and travelling, as the heir to an English or Scottish Dukedom should travel, beyond the influences of European conventionality. With Lord Lorne were his cousin Mr. Callender, in whom I recognised one of the midshipmen on board Sir James Hope's ship; and the Honourable Henry Strutt, Lord Belper's eldest son. It was not long before, having twice or thrice met the same party at the house of General O'Connor, the Commander-in-Chief, and elsewhere, I stayed with them for a few days under the roof of Mr. Harrison, a planter in St. Thomas-in-the-East, and accompanied them round the district in which the disturbances had broken out, and to which they were chiefly confined.

GODFREY TURNER.

(To be continued.)

PROGRESS OF INDIAN GAZETTEERS.

THE Gazetteers at present being prepared under the superintendence of Dr. Hunter in different provinces and presidencies of India, are in various stages of progress, but they may all be expected to be completed within two and a half years from the present date. The only exceptions are Bengal (including Assam) where the great size of the province, and the absence of settlement officers, makes the work fall heavily on the provincial editor. The time which it will take will probably be from three to four years. With regard to the others, those for the Central Provinces and Berars were published in 1870; those for the North-Western Provinces, the Panjab, Oudh and Mysore are in a forward state, some of the districts being already printed. In Bombay operations were commenced on a local plan, but having failed, they have been recommenced on the new system, and three districts will probably be ready for press by the end of 1874. In Madras, manuals of the seventeen districts are being prepared on a large scale by district officers, and four are published, the rest being in a forward state. Operations were reported as having commenced in British Burmah in 1867, and in 1870 the result made its appearance in a pamphlet in which seventeen pages were devoted to a description of the country, and seventy-two to lists of native kings. Captain Shearman is now at work collecting materials on a proper system. In the Native States the collection of statistics is so dependent on political considerations, that no regular progress can be predicted. Still some results are available. A concise gazetteer of Karauli, by Captain Powlett, has appeared, as well as an account of Manipur, by Dr. Brown, Political Agent, and one of Nepal, by Dr. Wright, some time acting Resident at that State.

The lists of places showing the recognized spelling to be adopted in gazetteers and other publications are urgently required both in India and England. They are now in a forward state, and we may accordingly soon look for some approach to uniformity in the spelling of Indian geographical names.

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Reviews.

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TELEGRAPH AND TRAVEL.*

THE title of this work implies a twofold character. But, in fact, the book, like British India and Omnis Gallia, is tripartite. The author himself, in a happy motto from Thackeray prefixed to Part II. (really Part III.), suggests a comparison with a charade; and if we follow out the suggestion, we may say his first is a biography, his second is a history, and his third is a collection of diaries. What his whole is remains to be considered. In doing this we shall treat the work in Oriental fashion, and begin at the end, *i. e.* with "Travel."

What an amount of toil the author has undergone, in working towards the important end of the stable telegraphic connection of India with England, may be judged from a fact which is nowhere stated by him, but which we have calculated upon the map prefixed to the title page.† This is, that his travels—land travels alone, and *in Persia and Bilúchistán alone*—with the addition merely of the short links needful to bind them to Baghdad on one side and Karáchi on the other, measured with a 50-mile opening of the compasses, and therefore far beneath the truth, amount to 5700 miles. The true distance cannot have been less than 7000 miles. We can understand the satisfaction with which Colonel Goldsmid, in 1869, by accomplishing the short journey of 110 miles between Gwádar and Charbar, on the Mekran coast, put in the only missing link in the achievement of the true overland journey between Karáchi and the Caspian.

The travel portion consists, in large part, of extracts from diaries, and in smaller part (but larger type) of pages of more condensed and digested material. On the whole we find the latter preferable, and could have wished the proportions reversed. Interesting notices and just observations will, however, be found scattered plentifully throughout the pages of both sorts.

Indian service always tends to develop idiosyncrasies: we generally expect them in a brother Anglo-Indian; and how much of our pleasure in retrospect, and in meeting old friends, is connected with these idiosyncrasies! One of Colonel Goldsmid's appears to be a love of tantalizing allusions and teasing initials. In the city where we are writing, when an editor reports offences against person or property, he is never so indelicate as to mention names. It is A. B. who sticks C. D. under the ribs, and E. F. who is arrested for firing a revolver "at lairge" (as one of Dean Ramsay's heroes would have said) in the streets of the city. Sir Frederic has a like practice. In ascending the Tigris, Captain S. is on the watch; Lieutenant B. goes after the wild hog; the party is swelled by the arrival of Colonel S., Lieutenant C., and Sir C. B. We may generally ascertain by some turning of pages to whom these initials belong, but when we are told that "Chevalier Romulus B. started for Tehran," we are justified in feeling aggrieved that we have no means of learning whether this worthy knight's cognomen bore any correspondence to his remarkable prænomen. When again we read that

> "Old Q. dines with us, and is evidently happy. His black costume, hanging coat, and quasi knickerbocker trousers; his nut-cracker nose and chin, and thin visage; his gait and attitude; above all the sinister facial expression give him the look of a second class Mephistophiles,"

who can help a suspicion that old Q. is an evasive euphony for "Old N.?"

Why should we be told of the Pasha of Sivas's strong resemblance to "one of our best known modern Indian heroes?" Are they (of all men on earth) all cut on one pattern? That teazes some readers as a bone in one's throat does. And when the author pays a tribute to one now departed, "who, whether discharging his official duties in Northern Persia, or on the shores of the Black Sea, could shed the light of his modest labours even upon Western Europe, and make his allotted corner, however remote, a centre of general and extensive usefulness"— why should nine-tenths of the author's readers be left in ignorance of the respected name of Mr. Keith Abbott?

Our excellent traveller and telegrapher (we ought to say T. and T.) is by no means unconscious of his own indulgence of this odd fancy. He alludes (p. 568) to having once spent a Christmas at Hūki, which place, he says, "I leave to be discovered on the map!" Now this shows the animus of the man, bent on setting his reader perpetual conundrums! The best map on which to look for Hooky is evidently that excellent one of Walker's; yet even on that we fear it will be sought in vain!

When we give utterance to irrepressible remonstrance against a scholar and a traveller like Colonel Goldsmid giving countenance, more than once, to the false spelling of London shop-windows, "solar topee,"* we have done with our presumptuous criticism, and will now Bee-like—perhaps we should say "B.-like"—seek here and there to extract food and flavour from "Travel."

Let us first take a pleasant sketch of Muhammad Ismail Khan, bearing the style of Wakíl-ul-Mulk, minister of the Prince nominally governing Kerman, and himself afterwards governor of that province:—

> "January 13.—Call on the Wakíl-ul-Mulk. . . . . our interview lasting an hour or more. He is short, very stout, has a large nose, and generally prominent features, with an eye sufficiently sharp to make itself appreciated through a pair of monster spectacles, which impart no little character to the portrait. He was dressed in a very clean and neat Persian costume, wearing a drab coat of beautifully fine texture, and red nether garments like those of the Indian Parsis. He received us with a brisk cordiality for which I was hardly prepared; and we had scarcely sat down at his invitation when he poured out a volley of compliments, and pleasant preambles to conversation, such as I had been little used to hear even from his talkative coun-

* *Telegraph and Travel, &c.* By Colonel Sir Frederic John Goldsmid, C.B., K.C.S.I., late Chief Director of the Government Indo-European Telegraph, &c. With maps and numerous illustrations. Macmillan & Co. 1874. 8vo., pp. xiv—673.

† This is an adapted map, and scarcely a satisfactory one. The author's routes are not correctly traced in it (compare that from Kerman to Charbar), and the nomenclature is discrepant. The Gwādar and Charbar of the book appear in the map as Gwetter and Choubar; Bampūr appears as Bunpore; Bamm and Kūm as Bumm and Kum, a pair which cannot both be right on any principle. Sir F. Goldsmid has probably not taken sufficient note of this map's peculiarities, before sanctioning its adoption.

* *Shola* (Hindustani) or, by the Bengali incompetence for the Shibboleth, *Sola*, is the vernacular name of the plant *Aeschynomene paludosa*, which gives the pith whereof such *topees* are made.

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trymen. The English were his *beau-ideal* of strangers; 'he had known them,' he said, 'from childhood; his father had been Sir John Malcolm's Mihmandar.' There never was such a man as Malcolm Sahib. Not only was he generous on the part of his government, but with his own money also. . . . . From this and Central Asian politics he came to the object of our journey, and here some difficulties presented themselves to his mind. Evidently he did not care to have the telegraph at his head-quarters; he suggested that a better road might be found for it from Yezd to the sea-coast than through Karman [shrewd Vicar of the State !]. . . . . Every now and then our energetic host would rise from his seat and *more suo* not *more Persico*, bustle about the room. He had things to show us, and not caring to have servants always about him, he fetched his own boxes, opened them with his own hand, stooped to pick up any fallen article—in short, proved himself a most agreeable rarity. . . . . Just as he could turn in an instant from personal cares to the details of provincial administration, so was he always ready to give attention to the cases and claims of individuals. He had the character of knowing the history of every resident in Karman, and, judging from ourselves, he took little time in learning the wants of strangers. . . . . I wished him to name some article of English or Indian manufacture he would allow me to forward from Bombay, as the merest souvenir of a short but pleasant acquaintance. Reiterating an assertion that he needed nothing but reciprocity of kindly feelings, he said, if I insisted on sending something, let it be a translation of the *History of Persia*, which he had understood the friend of his boyhood, Sir John Malcolm, had written. On his part he would give me a written account of Karman.* Like all his countrymen he had quaint superstitious notions. One was that, until arrived at forty, no man's judgment was to be trusted. . . . . Another was the infallibility of '*Mūmia*,' a kind of resin exuding from rock, to serve as a cure and prophylactic in physical emergencies . . . . In bidding us farewell, which he did in evident sincerity, the khan commended us to the protection of the Universal Father—of Him who is omnipotent without respect of places or persons."

A tiny box of the precious *mummy* was bestowed on Colonel Goldsmid, with a detail of the many virtues which it exercised alike on *morale* and *physique*, but without instructions whether the application was to be external or internal. We know, however, from the very curious account of *mumia* in Kämpfer's *Amœnitates Exoticæ*, that it was used in both ways.

It is a little the fashion now-a-days to disparage Sir John Malcolm, and M. de Khanikoff includes him in his somewhat wholesale depreciation of British travellers in Persia. Whilst we have such representatives in Persia as the telegraph officers have been, from Colonel Stewart downwards (we speak of *them* because we know what they are), we need not much mind such depreciation. But returning to Malcolm, that must have been a rare *Firinghi* who, by sight or hearsay, left such an impression on a whole Asiatic nation as has scarcely been left since the days of *Malik Rik;* he must have been no common *man*, who won such strong regard at once from Richard and from Arthur Wellesley, from Ismail Khan, and from Julius Hare.†

* A note informs us that both promises were kept; but the Malcolm was only completed after the khan's death, and was delivered to his son and successor.

† Hare calls Malcolm (see *Guesses at Truth*, pp. 216-219) "him, who among all the persons I have converst with to the edification of my understanding, had the keenest practical insight into human nature, and best knew the art of controlling and governing men, and winning them over to their good;"—and again—"the illustrious friend who was always so kind, always so generous, always so indulgent to the weaknesses of others, whilst he was always endeavouring to make them better than they were—he who was unwearied in acts of benevolence, ever aiming at the greatest, but never thinking the least beneath his notice—who could descend, without feeling that he sank from the command of armies and the government of an empire, to become a peace-maker in village brawls—he in whom dignity was so gentle, and wisdom so playful, and whose laurelled head was girt with a chaplet of all the domestic affections—the soldier, statesman, patriot, Sir John Malcolm."

At Mosul (p. 422), we read :—

"Went into the Church of the Miskinta (probably Arabic 'Miskīnah') who, the Syrian Bishop explained to me, was supposed to be the poor widow of St. Luke, xxi. 2;* also believed, as I understood, to be a martyr. Her tomb is exhibited."

This is a very curious and to us new example of the singular custom of individualizing anonymous characters in the Gospel history, or even parables, which has identified a House of *Dives*, still shown, we believe, at Jerusalem, and which in former days erected in Galilee a monastery dedicated to *Saint Architriclinus*, viz., to the 'Αρχιτρίκλινος or "Ruler of the Feast," at which the miracle of Cana was wrought (St. John ii. 9).

At Kazan (p. 508)—

"Visited the printing-office, a place of considerable attraction to me since buying a Koran printed there, from a Tartar in the Crimea, shortly before the close of the campaign in 1855-56. Here I found the whole establishment Russian, though Tartar workmen are employed in *setting up* the Arabic and Turkish types. What would have been said of the Honourable East India Company, had *they* printed and sold the Koran to the money profit of the State! The type is excellent, and the carefully punctuated volume would supply an infinite number of valuable readings to the Arabic student: but what Propaganda would sanction the principle involved in the result?"

Either the timber on the shores of the Caspian must be of the shortest, or the ideas of the Russians on those shores regarding proportion in domestic architecture must be peculiar. At Enzeli, on the southern coast, our traveller was most hospitably received (p. 532) by "the Russian Consul, Mr. P.," and accommodated in his traveller's room, "an apartment about 14 feet by 6, with pictures of flowers and females." But this is nothing to Astrakhan. There his room was "really a good room of its kind, 17 feet by 3, and about 18 feet high, with a well-boarded floor of good polish-taking wood; and it has two fine large windows. Furniture—sofa with dark glazed cover . . . five chairs, and two small tables . . . a looking-glass, a suspended double lamp, and . . . brass fixtures for a stove and lights." If there be no error of the press here, this too well furnished chamber must have been something like the garden of Dr. Hahnemann. A visitor who found him in it remarked on its very restricted width: "*Ja freilich*," said the Father of Infinitesimals, pointing to the heavens, "*aber es ist unendlich hoch!*"—narrow it is, but the height is infinite!

Sir Frederic, writing (it is fair to say) in 1864, makes these remarks:—

"I feel quite sure that the Electric Telegraph in Turkey is abused by those who have the power of abusing it, inasmuch as a vast number of telegrams on the public service are intercommunicated without the faintest occasion, and for the mere sake of gratifying vanity, or the whims of members of the administration. This entails much extra labour which could be avoided, and converts a valuable state engine into a plaything."

This surely was natural enough, considering the premature association of Turks and Telegraphs for the convenience of Christian allies. But if Sir Frederic will look up some of the reports on the expenses of mail-carriage and the abuses of franking, that were obtained under the stimulation of Sir Rowland Hill, previous to

* Also of St. Mark, xii. 41. *Miskīn* means indigent; Miskīnah or *Miskīnat*, a poor woman. And hence Italian *Meschino*.

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the great Postage Reform, he will find record of analogous abuses in England on a much vaster scale and with much less apology.

The second section of the work, which we have characterised as history, is a condensation of many official reports and many personal recollections; and even the analysis of it would require more space than these columns can afford.

This part of the work in some respects bears an analogy to Mr. Markham's *History of the Indian Surveys*, and among its valuable attributes we give no low place to the fact that it follows the example first prominently set in that official publication, of preserving a detailed commemoration of those who rendered good service in a great civil enterprise. Nothing in this creditable book is more conspicuous than the author's generous appreciation of those who have worked with him, from his deputy down to the sapper-corporals; and in their favour even his love of initials is overcome. To one alone of those who bore the burden and heat of these labours no justice is done here; and hardly even an initial is spared for Colonel G.!

We think it is perhaps a pity that Sir Frederic did not add a few pages on the history of the Red Sea cables. Allusions to those other costly strings to our telegraphic bow necessarily come in; and these need some elucidation, whilst the addition would also have rendered the record a complete one of an important episode in the history of British rule in India.

Though the body of the work is divided according to its title, there is necessarily some "Telegraph" in "Travel," and a good deal of "Travel" in "Telegraph." Take the following as an example of what telegraph officers had to do in the way of travel:—

"Lieutenant Champain left London for Persia *viâ* the Danube and Tiflis, on the 12th September (1863); found two of his most active assistants, Messrs. Hoelzer and Walton, hard at work at Tehran on arrival there, the 20th October; quitted Tehran the 3rd November; and riding post the greater part of the way, reached Bushahr on the 17th *id.* Here he met Captain Murdock Smith and the non-commissioned officers of R.E., with whom he returned to the capital, leaving Bushahr on the 7th December, and reaching Tehran on the 28th January, 1864. Those .... knowing something of the kind of country to be traversed, and means of traversing it .... will acknowledge that this was rather severe travelling; and the more so when a journey from Tehran to Baghdad, Baghdad to Alexandretta (*viâ* Aleppo), and Alexandretta to London, had been performed by the same officer in the previous year; and a tour of inspection from Tehran to Baghdad, thence to Bushahr and back to Tehran, added to a further journey from Tehran to Baghdad, and Baghdad to Samsun, Constantinople and London, were to mark for him the first half of the years 1864 and 1865 respectively" (p. 221).

And the next quotations will illustrate the sort of refreshment that occupied the intervals between these journeys:—

"The Governor of Bushahr had assisted Lieutenant St. John, but as soon as the line had passed through his territory into that of the Governor of Shiraz. .... the labourers, no longer paid or fed, rapidly deserted; no representations to the Governor of Shiraz had any effect, and when the directors came up with the working party he found that it only numbered ten men out of sixty at first engaged. At Shiraz he tried three times to see the governor, but was always refused admittance" (p. 225). Again, in the district in which the capital itself was included—"all this time the most stringent orders had been continually sent by the Persian ministers and the Shah himself to the Governor of Tehran, who for three months would take no notice whatever of the *firmans*. An officer of the king's was quartered in the governor's house to insure obedience, but without effect .... Nothing would induce the Persian authorities at Tehran to give us either mules or men for the work" (p. 227). Justly did Major Champain on reporting completion of the first wire of communication, pronounce the conduct of the officers and men to have been "admirable," adding that it was "to their intense perseverance and patience, notwithstanding the most harassing and vexatious treatment" that he attributed success, so far as it had been obtained (p. 228).

If the remonstrances of the British officers had little effect, it cannot however be said that their recommendations carried no weight. One of the Persian assistants had displayed conspicuous energy and activity. The speedy completion of one part of the line was considered due "to his unwearied efforts." And a hope was expressed that "his services might be brought to the notice of the Government of his Majesty the Shah." And the author has learned accordingly that this unfortunate gentleman was turned out of the Persian service, *receiving a severe bastinado*, shortly after his return to Tehran! "The pretext for such treatment was peculation, of which he was assuredly guilty, but not more so than the rest of those who were similarly tempted" (p. 241).

There are, however, in Persia *firmans* and *firmans*; just as there used to be at the Horse Guards a "C. in C.'s List" and a "C. in C.'s *private* List," that meant very different things to candidates for commissions. How the extraordinary firman, that *meant* mischief, could come into play with excellent effect, may be read at pp. 253-254, but no space remains for extract.

Here let us notice the additional interest given to the work by its woodcuts, many of them from sketches by officers of the Telegraph. As among the most interesting we may specify that of the wire passing over the *Kotal Dukhtar* ("Jungfrau Pass"), between Shiraz and the sea, by Major St. John (p. 308); the Bastinado (reward of *trop de zèle*) by Captain Pierson (p. 537); the singular position of Yezd-i-khast, by Major Champain (p. 226); the capital Tom-Hood-like sketches of the Turkish soldier as he was, contrasted with the Turkish soldier as he is (pp. 428-429).

We now turn, for the brief space that remains, to that monument which stands so becomingly at the entrance of this record of successful enterprise—the Memoir of Colonel Patrick Stewart.

The official reputation of every public servant, unless he be one whom circumstances place at once on the page of history, rests largely in the hands of his successor. And it is pleasant to see the hearty affection and admiration with which Colonel Goldsmid writes of him whose successor he was. His paper is no perfunctory task; nor indeed had other motives than those that we have indicated rendered necessary the introduction of this memoir, welcome and appropriate as it is.

Fifteen years ago the Viceroy of India had under his authority for war or peace a certain body of officers, some 120 in number. Though, in the old formula of homely deprecation, "one says it who shouldn't say it," it may be doubted if any

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corps in the service of England ever combined a greater variety of character and ability, with such zealous loyalty to the Government (in spite of chartered rights of grumbling), such hearty mutual regard and pride in one another. Here was a delicate machine, one should have thought, that a government might have deemed it worth while to bestow some care on, in removing defects, perfecting training, and utilizing widely. But the Powers that were (Powers not in Calcutta, but at Westminster) were possessed for the moment with the spirit which *Punch* ascribes to the Mining Districts, and in the sentiment, if not in the language, of that population, their whole utterance in reference to the organization aforesaid, seemed to be "Go to now! Let us heave a brick at it!" Anyhow Authority hung an extinguisher over the head of the Bengal Engineers, and we still watch its slow descent, as one after another of the old comrades retires from active service in India or on earth. Nevertheless, the lamp of the beloved corps seems to burn all the brighter in the shadow of descending fate. Soon in the revolving years it will have to go out. But Magdala and Dorking give us assurance in different directions that it will not go out in an ill odour; and the part played in the history before us by Stewart, Champain, St. John, and Pierson, does the same. No doubt it must have come to an end one day—"Time hath his revolutions; there must be a period and an end to all temporal things—*finis rerum*—an end of names and dignities, and whatsoever is terrene; and why not of"—the Bengal Engineers! Yet for the inevitable end that comes to all, it is not forbidden lovers and kinsfolk to lament.*

Stewart joined the corps only in 1852, and yet when he died, in 1865, there was no man of whom it was more proud than of him. His early success neither spoiled him, nor begot envy in others. His early death left blank, as all who knew his career believed, an eminent place in English history; perhaps not that, for his name may yet live there as the first to mould the Electric Telegraph into a weapon of war.

Colonel Goldsmid refers to Stewart as an example to be imitated. But it is the Collingwoods rather than the Nelsons that can be held up as examples. Ordinary men might as well aspire to assimilate their features to that eager and winning countenance—like "Young Harry's with his beaver up"—that forms the frontispiece and best adornment of this book, as take for a literal pattern that bright and ardent spirit, so rich in manifold gifts of God and in man's favour.

His last years of consuming labour were spent on the great task of which this book treats; and there seems something marvellously fitting in the fact that his tomb is beside that central point of the communication, that link between Europe and Asia, that glowing focus of past and future history—Constantinople; whilst a second memorial is dedicated to his name in Galloway, a third at Karáchi.

H. Yule.

Palermo, *August* 1874.

* All this applies in substance to the other two Indian corps of Engineers; but till recently presidential separation was rigid, and did not admit, as a general rule, of that strong common feeling here noted as characteristic.

Practical Notes on Marine Surveying and Nautical Astronomy. By *Captain Richard C. Mayne, R.N., C.B., F.R.G.S., late in command of the Straits of Magellan Survey.* (Potter, 1874).

In the absence of an efficiently organised naval surveying service, such as existed in the days of Sir Francis Beaufort, the chief reliance must be on the voluntary efforts of officers serving in various parts of the world, who have frequent opportunities of making useful additions to our foreign surveys. As a manual of instruction in surveying for the use of naval officers, Captain Mayne's work will be most valuable. It will serve two objects, both of which are of great importance. It will assist officers in the practical part of surveying, and it will, no doubt, incite many to a deeper study of the subjects which Captain Mayne treats chiefly from a practical point of view. In the opening chapter the importance is enforced of obtaining a fixed position by observation in commencing a survey, instead of adopting a probably unreliable latitude and longitude from the coast chart supplied by the Admiralty. The three next chapters give sufficiently complete instructions respecting the care of chronometers, taking sights for time, the observation of latitude by circum-meridional and double altitudes, and the variation and deviation of the compass. After obtaining a fixed position, the next operation is the measurement of a base, either by chain measurement, or the use of the micrometer, or by sound, or mast-head angles; the two latter methods being used when it is impossible to land. A chapter is devoted to the subject of base measurements; and another, containing many useful hints and suggestions, to triangulation and the delineation of coast lines. The chapter on soundings and tides will also be found to contain excellent practical instructions. In the latter part of his work Captain Mayne supplies volunteer surveyors with complete information respecting the plotting of work; including details as to the sizes of paper, drawing boards, stretching and mounting, sketching in details, projection and the plotting of a running survey. But not the least valuable part of this excellent little work is the concluding chapter, which contains many miscellaneous items of information, and the appendices. Captain Mayne, whose distinguished services in the survey of the Straits of Magellan are well known, has conferred a boon of no small importance on his profession by the publication of these practical notes, which will, we are confident, be as seed falling on fertile ground, and will produce an abundant harvest, in the shape of new surveys in all parts of the world.

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The Geography of British History: A Geographical Description of the British Islands at Successive Periods from the Earliest Times to the Present Day. By *William Hughes* (New Edition, Longmans, 1874).

History, without the aid of geography, is a barren and unintelligible study. The course of historical events cannot be clearly understood, without definite notions of the physical aspects of the region in which they took place; and especially is a knowledge of topographical details essential in the study of battles and other military operations. As an aid to this necessary combination of the study of historical events with geographical knowledge, Mr. Hughes's work is admirably conceived. After describing the physical aspects of England, Scotland, and Wales, he gives the distribution of tribes and races, and the political divisions at the several important historical epochs, a useful sketch of the progress of English colonization, and some topographical details touching the sites of battles and sieges. The book also contains information respecting geographical nomen-

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clature and the derivation of names. The plan is certainly excellent; but more care should have been taken to secure accuracy in details; for unless a work of this kind is correct and perfectly reliable it loses half its value. We notice several inaccuracies in the chapters on battle-fields, which should be corrected in a future edition; and we observe that, as a rule, the sources of information quoted by Mr. Hughes are second-hand, and the details are meagre and insufficient. One is surprised, in these days, to see Hume quoted as an authority, while there is a total absence of all reference to such really reliable sources of information as are often to be found in local histories. This want of research has led Mr. Hughes into some serious blunders. For instance, we are told that the battle of Atherton Moor was fought in Lancashire. Such a notion renders it impossible to comprehend the important Yorkshire campaign of the summer of 1643. Atherton (more correctly Adwalton) Moor is near Bradford in Yorkshire, and Mr. Hughes would have found the fullest topographical details, respecting the memorable battle which was fought there, in *Scatcherd's History of Morley*. We would suggest also, that while the accounts of each battle-field in the text must unavoidably be in a closely condensed form, very full references to more complete information should be given in foot-notes. The book is capable of much improvement, but the design is good, and, with some additions and corrections in future editions, Mr. Hughes's *Geography of British History* may become a really valuable companion to the study of the annals of this country.

THE NIJNI-NOVGOROD FAIR, 1874.

FROM some of the Russian papers we gather a few interesting details respecting this great fair. Some do not hesitate to predict a marked decrease in its importance now that Nijni itself has become the centre of a network of railways. On the other hand, it is urged that the general increase of commerce resulting from improved communications renders it more than ever necessary for merchants to meet together at times and compare notes on the general condition of trade. The correctness of this view is borne out by the fact that the great fairs seem to do more business than they used. The Nijni fair began this year much later than usual, a fact which is ascribed to the improved communications which admit of traders fixing and so economising their own time for the transaction of business. The sale of manufactured products has been slack, and at much lower prices than usual. Eight houses, it is suspected, will be unable to meet their engagements in this line, and this will probably occasion a deficit of two million roubles. Furs have been scarce and have thus fetched higher prices; sixty thousand chests of fine teas have been imported, and on these a good profit has been made, while on the ordinary sorts there has been a very general loss. Every recurring fair at Nijni proves that the trade overland from Peking to Kiachta is on the decline, the competition of the sea-imported teas from Canton, and other ports, being too powerful. Only a small quantity of Canton tea, however, was sold, and this was limited to high-priced specimens of the finer sorts; the common sorts on the other hand were so absurdly cheap that people are clamouring for some strict customs legislation which will prevent these adulterated teas from being forced into the market by Koenigsberg merchants, as they are at present. As purchasers of high-priced teas, imported *viâ* Kiachta, are getting more numerous, one may anticipate that the inferior Canton sorts will gradually disappear from the market. Iron and wheat play the next most important part, and in these a good trade has been done. The sale of Central Asian goods has not yet begun. The sanitary condition of affairs is satisfactory.

Bibliography.

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EUROPE.

FETRIDGE (W. P.) Harper's Guide Book for Travellers in Europe and the East. 12mo. 3 vols. Maps. New ed. New York, 1874. 35s.

MORFORD (H.) Short Trip Guide to Europe (British Islands, France, Germany, Switzerland, Italy, Spain, &c.). 16mo., pp. 437. Boston, 1874. 10s. London ed., 7s. 6d.

RATZEL (F.) Wandertage eines Naturforschers. 2 Theil. Schilderungen aus Siebenbürgen und den Alpen. 8vo., pp. 292. Leipzig, 1874. 5s.

BRITISH ISLANDS.

THE Geography and History of the Counties of England; a Companion Volume to Philip's Handy County Atlas. 12mo. London, 1874. 5s.

DE AMICIS (E.) Ricordi di Londra. 8vo., pp. 108. Illustrated. Milan, 1874. 1s. 3d.

SANDRINGHAM; A complete Description of the Royal Residence and Estate, and its Surroundings. 12mo., pp. 18. London, 1874. 6d.

COWIE (R.) Shetland, Descriptive and Historical. 12mo., pp. 340. Edinburgh, 1874. 4s. 6d.

FRANCE.

LARUE (A.) Manuel des voies navigables de la France. 8vo., pp. 334. Paris, 1874.

JOANNE (A.) Géographie du département des Bouches-du-Rhône. 12mo., pp. 72. Map and Woodcuts. Paris, 1874. 9d.

LIÉGARD (S.) Vingt journées d'un touriste au pays de Luchon. 18mo., pp. 564. Map. Paris, 1874. 3s.

MACQUOID (Katherine S.) Through Normandy. Illustrated. 8vo., pp. 576. London, 1874. 12s.

GUIDE de l'étranger dans Paris et ses environs, illustré de 190 gravures sur bois d'après A. de Bar, H. Clerget, &c. pp. 372. Paris (Grand Hotel), 1874.

GALIGNANI's Paris Guide for 1874. 12mo., pp. 472. Plates. Paris, 1874. 5s.

GUIDE complet des étrangers à Lyon. 12mo., pp. 194. Map. Lyon, 1874. 7½d.

AUSTRO-HUNGARY.

HELLBACH (Dr. R.) der Führer durch ganz Oesterrich. Handbuch f. Reisends in Oesterrich-Ungarn. 8vo., pp. 440. Maps and illustrations. Vienna, 1874. 7s. 9d.

HAUER (Dr. F. v.) die Geologie u. ihre Anwendung auf die Kenntniss der Bodenbeschaffheit der Oesterreichisch-ungarischen Monarchie. 8vo., part i. (pp. 80.) Vienna, 1874. 2s.

DER Bergwerks-Betrieb Oesterreichs im J. 1873. 1. Theil (Tabellen) hsg. vom Açkerbau-Ministerium. 8vo., pp. 60. Vienna, 1874. 2s.

HELLBACH (Dr. R.) Reise-Handbuch durch das südliche Oesterreich u. Steermark, Salzburg, Tirol, Kärnten, Krain, und Küstenland. 8vo., pp. 296. Maps. Vienna, 1874. 4s. 6d.

ARCHIV für die naturwissensch. Landesdurchforschung von Böhmen. Red von Dr. C. Koristka und J. Krejci. 2 Band, 2 Abth. 4to., pp. 740. Maps and illustrations (Geology of Bohemia). Prague, 1874. 15s.

PRITCHARD (H. B.) Tramps in the Tyrol. 8vo., pp. 276. London, 1874. 7s. 6d.

AMTHOR (Dr. E.) u. JABORNEGG-GAMSENEGG (M. v.) Kärntner-Führer. Reisehandbuch für Kärnten, &c. 16mo., pp. 230. Maps. Gera, 1874. 4s.

JAHRBUCH des steirischen Gebirgsvereins für 1873. Red. von J. Frischauf u. A. Martiner. 8vo., pp. 124. Plates. Graz, 1874. 2s. 6d.

OBERTH (A.) The indispensable companion to Vienna, a Hand-book for Vienna, its suburbs and environs, &c. 16mo., pp. 146. Maps. Vienna, 1874. 1s. 8d.

BUHLER (A.) Führer durch Salzburg, den Pinzgau und das Salzkammergut. 8vo., pp. 116. Reichenhall, 1874. 1s. 6d.

BLAWACEK (Dr. E.) Karlsbad in geschichtlicher, medicinischer u. topogr. Beziehung. 11 ed. 16mo., pp. 344. Map. Karlsbad, 1874. 4s. 9d.

CZOERNIG (C. v.) Görz, Oesterreich's Nizza. Nebst Darstellung des Landes Görz u. Gradisca. 2 Bd. 8vo., pp. 146. Map. Vienna, 1874. 3s. (Vols. 1 and 2., 18s.)

MITTHEILUNGEN aus dem Jahrbuche der k. ungarischen geologischen Anstalt. 2 Band. 8vo., pp. 234. Pest, 1872-3. 9s.

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Cartography.

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Erhard's Wall Map of France.*

AMONGST French cartographers one of the foremost positions is held by Mr. Erhard, and the wall map lately published by him would do credit to any author. Only, it must be treated as a wall map! Those who expect details commensurate with the scale of the map, or who examine it closely, or through a magnifying glass, may possibly feel disappointed. But let the four sheets be mounted, and the map suspended to a wall, as its author intends it to be, and its colours will be found to harmonize, its features to stand out clearly and distinctly. The map has been produced in chromo-lithography; the rivers are blue, the land is tinted green or brown according to whether it is fertile, arable, or sterile waste, and the hills are carefully and effectively delineated. The number of names is large (though they will not be found to interfere with the other features if the map be looked at from a distance. The railways, so important a feature on our modern maps, are shown in red. We are not exactly in a position to say that the map now before us fully realizes our ideas of what a map ought to be, but it is evidently a work of thought, and fully deserving the attention of all those engaged in the production of maps, or engaged in tuition.

Atlas of Swiss Industry and Commerce.†

IN Dr. H. Wartmann's "Atlas of the development of Swiss Industry and Commerce" we are presented with one of the most successful cartographical illustrations of statistical facts. The work consists of two sets of maps, together with a general map of Switzerland and a map of the world, showing the towns with which commercial intercourse is maintained and the routes by which Swiss merchandize is generally forwarded to them. The first set of maps illustrates the extension of the principal branches of industry in 1770, 1820, and 1870. The districts where each branch is carried on are tinted, and by comparing the maps, we are thus enabled to trace the gradual spread of each. The second set shows the countries to which Swiss manufactures were exported at the periods named, distinguishing the principal articles as well as the countries supplied direct and those supplied indirectly, through foreign merchants. The work is most instructive, and reflects great credit upon the "Swiss Commission for the Vienna Exhibition," at whose instance it has been published. The maps have been engraved and printed at Wurster and Randegger's renowned establishment.

Map of Canada.‡

THIS map has been compiled under the direction of Mr. Thomas Devine, the Deputy Surveyor-General for Ontario, who is already well-known for works of the same kind. It embraces the whole of the Dominion from the gulf of St. Lawrence to Manitoba, shows the boundaries of counties, position of principal towns, and lines of rail, and is coloured to indicate the nationality of the present settlers. This map amply justifies the proverb of "Birds of a feather flock together," for English, French and Germans, Irish and Scotch, they all—as far as the big and uniform patches of colour upon the map permit our forming an opinion—occupy continuous tracts of country. E. G. RAVENSTEIN.

* France, par Erhard. D'après la carte oro-hydrographique publiée, sous les auspices du ministère de l'instruction publique, par la Commission de la Topographie des Gaules. 1 : 800,000. Paris, 1874 (Size 6½ by 7 feet).

† Atlas über die Entwicklung von Industrie und Handel der Schweiz, von Dr. G. Wartmann. 8 maps, with notes in German and French. Winterthur, 1873. (London, Trübner), 25s.

‡ Government map of part of the Dominion of Canada, compiled under the direction of Thomas Devine. Scale, 28 miles to the inch. Ontario (Office of Crown Lands), 1873.

Log Book.

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The Congo Expedition.—News has been received from Lieutenant Grandy, who was at Sierra Leone, on his way home. He appears to have failed in his great object of ascending the Congo; but he has gone over much new ground, and valuable geographical information may be anticipated as the result of his explorations.

Geographical Work in Bolivia.—The residence of Captain Musters, R.N., the explorer of Patagonia, in the capital of Bolivia, is producing much valuable geographical work. He has fixed the position of Chuquisaca or Sucre, the Bolivian capital, with the aid of Captain Cilley, late of the United States Navy, and Mr. Minchin, C.E. The longitude, from the mean of thirty lunar distances, is 65° 30′ W. The latitude 19° 2′ 30″ S. The height above the sea 9233 feet. Mr. Minchin has fixed the latitude of Potosi at 20° 18′ 33″ S.

Routes between Bolivia and Paraguay.—In June 1874 Commander Cilley, a retired officer of the United States Navy, arrived at Chuquisaca from Buenos Ayres, by way of Paraguay, Otuquis, and Curumba, to Santa Cruz de la Sierra. After spending four months in verifying the work of Captain Page of the 'Waterwitch' expedition of 1859, Captain Cilley ascended the Otuquis to points never before reached, finding its true course, and also that it is navigable for river steamers up to a point where there is firm ground fit for commencing a railroad, and plenty of timber for sleepers. On his arrival in Bolivia, the Government of that Republic organised an expedition to pass from a place called Sauces, on the frontier, to the Otuquis, following, if possible, the 19th parallel. The expedition is commanded by Colonel Mujia, who is assisted in the scientific work by a young German named Arturo Claudius; and fifty Bolivian soldiers are to form an escort against the savage Indians. Claudius joined the expedition at the instigation of Captain Musters, and will forward his observations to that office for computation. Mujia is eventually to proceed to Curumba, to lay down the boundary line between Bolivia and Brazil.

Colonization in Peru.—A small French colony has been formed on the eastern slopes of the Peruvian Andes, in the valley of the Chanchamayu (east of Tarma), on a somewhat smaller scale than that of the German colony on the Pozuzu. The French settlers are under the lead and guidance of a M. Davis. In July 1874 the Peruvian Government despatched an expeditionary force to explore the lower course of the Chanchamayu, which, at the latest dates, had passed Fort Merced and crossed the river by *balsas*. The force was divided into two columns. One, under Colonel Ayarza, with considerable difficulty reached the banks of the river Tulumayu, opposite Fort San Ramon. The French colony is established round Fort Merced, where the young Frenchmen have commenced to clear the land for cultivation, while they have volunteered to serve under Colonel Ayarza, in the event of hostilities from the wild Chuncho

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Indians. The health of the colonists is good, and they express themselves as contented with the prospects before them.

A Russian Railway from Tiflis to Tehran.—A project which has for some time been talked of in Russian circles and discussed in various publications, has now assumed a more decided shape. For the last few months a Russian Engineer Officer has been residing at Tehran, with the view of gaining the consent of the Persian Government to the construction of a railway between Tiflis and Tehran. Every guarantee will, it is said, be freely given by Russia, and the Shah's government appears not unfavourable to the scheme. Our Foreign Office, however, as might be supposed, is raising the most strenuous opposition. The end of the affair will not unlikely be that to avert this danger, England may have to disgorge a larger sum than would have bought up Baron Reuter's concession. The moral is much the same as might be drawn from the Suez Canal affair. Considering in both cases it is England who really pays, we may well exclaim *Sic nos non nobis!*

Exploration of Sumatra.—The Dutch Geographical Society has determined to equip and despatch an expedition, with the object of exploring the little known portions of the east coast of Sumatra.

Roman Catholic Mission in Mongolia.—Father Verlinden, one of the Belgian missionaries of Mongolia, has communicated to the *Indo-European Correspondence* of Calcutta an interesting letter descriptive of his journey through the Ordos country. He and his companion followed the same route as that taken by the Jesuit Surveyors in the last century (see *Ocean Highways* for February 1874, p. 475), and crossed the still frozen Hoang-Ho at Totochung, 28 leagues south of where Prjevalski, and within 18 of where Huc and Gabet crossed. Father Verlinden describes the Ordos country as 120 leagues long from east to west, and 30 from north to south, and as divided into seven petty kingdoms, whose chiefs acknowledge the sovereignty of the Chinese Emperor. The Ordos inhabitants have not forfeited the character for honesty they earned in the time of the Emperor Khang-hi, for the missionaries could leave their baggage outside the tents and their horses loose without fear. The ravages of the Muhammadans, who invaded the Ordos country in February 1868, were fearful, and it is calculated that four-fifths of the inhabitants were put to the sword by them. Cattle were carried off, and all dwellings, tents and temples were burnt. The Muhammadans remained masters of the country for five years, and were finally driven back by the Imperialist troops. The missionaries find the people most amenable to Christian teaching; they willingly share their food with the fathers and will not accept payment. It is said the Emperor of China has sent large sums to the Ordos chiefs to enable them to bring their people back, and buy live-stock and seed, for at present the survivors only eke out a bare subsistence on game and mushrooms. At Ning-cheo-leang, where Father Verlinden writes from, a small colony of about 200 Christians, who had originally emigrated from Shensi, existed previous to the Muhammadan invasion. The spiritual wants were administered to by the Franciscan fathers of the Vicariate Apostolic at Si-ngan-fu; but on the irruption of the Muhammadans some hundred and forty were murdered, the rest remaining concealed in the ruins of houses. The Chinese soldiers of the garrison finding themselves outnumbered suffered themselves to be butchered to a man in their barracks without resistance. It is supposed that if the Christians had had the courage to declare their religion they might have been spared, as the Muhammadans, whose object it was to seize Peking, have a dread of offending the Christian powers, and spared one man who announced that he was a Christian. The Belgian missionaries intend to establish a boarding school for boys, and thus partially cut off the source from whence the lama hierachy is supplied.

The French Mission to Burma; Death of Captain Fau.—We regret to have to announce the death of this promising young officer, who, with Captain Moreau, was attached as scientific member to the French Mission to Burma. The treaty of commerce concluded with the Burmese plenipotentiaries last year necessitated the despatch of a return embassy on the part of France, and M. de Rochechouart, the French Minister in the East, was entrusted with the charge of the mission, which arrived at Mandalay at the close of 1873. Captains Fau and Moreau, who intended to remain behind and explore for about a year, were most kindly received by the king: his majesty, not content with providing them with escorts and means of transport, would have fain thrust money upon them. After three months' sojourn at Mandalay, they sailed on the 2nd of April for Mone, a town of about 20,000 inhabitants. They proposed to traverse the country between the Irawadi and the Salwen, and to make for Kiang-Hung on the Mekong River. The town of Mone is situated partly on the slope and partly at the foot of a hill, and presents a picturesque appearance, the numerous pagodas and houses being embowered in trees. But the luxuriant woods which skirt the town at the base are bounded by extensive rice-fields, and fever here is rife in the rainy season. Fau and Moreau, however, arrived during the dry season, and it was not till the 26th of May, when they were preparing to leave, that the approach of the rains brought their dread concomitant evil. At the end of the month many of the party were laid up, and three natives subsequently died. At the beginning of July Captain Fau had been confined to his bed for five or six days with a sharp attack of jungle fever, but Moreau unfortunately hesitated to administer quinine for fear of aggravating the malady, and the disordered state of the bowels. On July the 9th the invalid rallied, and preparations were made to take him to the hills in the vicinity of Kiang-Hung. But it was too late; the following day the fever returned with redoubled intensity, and Captain Fau breathed his last on the 11th of July. The natives have made a coffin of teak to convey the body to Mandalay, from whence it will be taken to France. It is unfortunate that Moreau had not with him some valuable notes of Dr. Thorel, who, while attached to the former French Expedition up the Mekong River, in the capacity of surgeon, made a special study of the fevers prevalent in this region, and had been most suceessful in his treatments.

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Proceedings of Geographical Societies.

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BRITISH ASSOCIATION.

Section E.

We supplement our report on the Meeting of the Geographical Section of the British Association by a few additional details concerning subjects which may be assumed to be of general interest.

Arctic Exploration.—At a committee meeting, held on the 20th of August, Admiral Ommanney proposed "that the Council of the British Association should be requested to take such steps as they might think desirable for supporting the request to Her Majesty's Government to undertake an Arctic Expedition, on the basis proposed by the Royal Geographical Society, at the beginning of the present year, and which proposition, it was understood, would be again made by that body." The Council acceded to this request, and we trust soon to be able to report that preparations for fitting out an expedition are actively in progress. In the discussion which followed the reading of Admiral Osborn's paper, Admiral Ommanney said that he had not the least doubt about the North Pole being now within our reach, especially as our means of travelling had improved wonderfully since Parry's memorable expedition. If Hall's crew had been as disciplined as the crew of a man-of-war, he would no doubt have succeeded in reaching winter-quarters within easy reach of the Pole. He considered that Esquimaux dogs, which could readily be procured in Greenland, would prove better auxiliaries than reindeer. Smith Sound, in his opinion, offered the most advantageous base to start from, and a well-organized government expedition had more chance than one started by private enterprise. Captain Griffith Jenkins said that Arctic expeditions were likely to promote largely the science of electricity. Our knowledge of electricity had made much progress since the earlier expeditions to the polar regions, when Ross and Parry discovered the magnetic pole. Electricity was now largely employed in our communications in all parts of the world, and as no lightning occurred in the polar regions, nor electric disturbances, these appeared to offer the greatest advantages for a successful investigation of that subject. Mr. John Ball thought it would prove interesting to ascertain the rate of upheaval of the land, now going on not only in Spitzbergen, but over a large portion of the polar regions. He also recommended that the Arctic glaciers should be explored, for they might probably afford some information more certain than that derivable from the Alps, as to cyclical changes of the seasons.

We cannot do better than conclude this notice with the concluding words of Major Wilson's able address. He said, "As regards the general subject of Arctic exploration, there can, I think, be no doubt that that by Smith's Sound would yield the most important scientific results, and would at the same time offer great facilities for reaching the Pole itself. It should not be forgotten that all recent polar expeditions sent out from this country have been despatched with the special object of ascertaining the fate of Sir John Franklin, and that discovery was not a principal object . . . . In the words of a well-known Arctic explorer, 'what remains to be done is a mere flea-bite to what has already been accomplished.' Morton, the second mate of the 'Polaris,' says, as the result of his third voyage, that he is 'more than ever convinced of the practicability and possibility of reaching the Pole'; and, if I may express my own opinion, it would be, in the words attached to a picture at the last exhibition of the Royal Academy in London, 'It is to be done, and England ought to do it.'"

Colonel Gordon on the Upper Nile.—Major Wilson read a letter recently received from Colonel Gordon, R.E., who is now in command of the Egyptian forces on the Upper Nile, and which is dated Sobat River, 26th June 1874. Colonel Gordon says:—"We arrived from Khartoum a week ago, and have made a station here, and great friends with the Shilluk natives, who come across in great numbers from the other side of the river. They are very poorly off, and I gave them a little grain—a very little contents them. I have employed them to plant grain, and they do it very fairly. They do not do it for themselves, for it would probably be taken from them. . . . . I hope to get their confidence, and really do something at each of my stations; of course, it is infinitely small amongst the mass, but may solve the question whether the negro will work sufficiently to keep himself if he has security of life and property." Colonel Gordon had sent notice to three slave stations on the Bahr Giraffe to be abandoned. He had also received intimation that a caravan with 2,000 cows that had been stolen, and a number of slaves, was on its way to the station Fashoda (opposite the Sobat), and proposed to intercept it on its way down, take the slaves back to their own country, and punish the slave-dealers.

From information received subsequently, we learn that the gallant colonel was still at the Sobat towards the end of July, and was preparing an expedition to explore the Sobat River. We learn, too, that a large slave caravan was captured by the Egyptian authorities in Southern Kordofan. This was probably the caravan alluded to in Colonel Gordon's letter, whose charitable intention of taking the slaves back to their own country was not, however, carried out by the captors, for 137 men were enrolled in the Egyptian army, 331 women were given in marriage to soldiers, and 96 children placed in the Khedive's schools. Thirty-seven slaves died after the capture.

Professor Carpenter on Oceanic Circulation.—In an eloquent and lucid address, which was listened to by an attentive audience, Dr. Carpenter developed his well-known views on the general circulation of the ocean. He again took this opportunity to state that his theories had been anticipated by Dr. Lenz, of St. Petersburg, as far back as 1845, but that his own conclusions had been arrived at independently, for his attention had only recently been directed to Lenz's investigations.

Mr. John Ball said that Dr. Carpenter's theory might be looked upon as having satisfactorily been established, still the influence of such agencies as winds, friction, &c., must not be overlooked, and the Gulf Stream was due, no doubt, to an accumulation of forces. Lieutenant Chermside said he looked upon differences of specific gravity of the sea-water, caused by variations of salinity, as the main cause of ocean currents. A body of warm water, by containing more salt, might thus underlie the colder strata, and this he had actually ascertained to be the case in the Spitzbergen seas. Mr. Aitken said he had made trough experiments with hot and cold sea-water, and his results differed in several important particulars from those obtained by Professor Carpenter. The latter, in reply, stated that most of the objections raised had previously been anticipated, and carefully considered. Future deep-sea temperature observations would be taken with a new thermometer ingeniously constructed by Messrs. Negretti and Zambra, and it was now possible to ascertain the temperature at any given place below the surface, whilst the old thermometers had registered merely the maximum and minimum temperature of the strata through which they passed. He proposed to continue his trough experiments on an enlarged scale. He fully recognised the influence of winds, differences of salinity and other causes upon currents. In the opinion of Mr. Hawkshaw, however, friction exercised no perceptible effect, whilst the slightest difference in the specific gravity was capable of producing movements of water on the largest scale. Dr. Meier, of Kiel, who was now at the head of a scientific

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commission for exploring the German seas, and who had devoted much attention to the subject under discussion, fully shared his views.

NIKITIN'S TRAVELS.—Mr. Delmar Morgan stated that he had learnt since his arrival at Belfast that a commentary on Nikitin's travels by Mr. Major had already been published in one of the volumes of the Hakluyt Society, but that, as his own commentary contained a great deal of original matter, he felt justified in placing it before the meeting.

The paper having been read, M. de Khanikof thanked Mr. Morgan for so frequently placing the results of Russian geographical explorations before the English public. He considered the elucidation of the accounts of ancient travellers by the light of modern science to be of great importance. If the travels of Clavijo (so ably edited by Mr. Clements Markham) had been consulted in the compilation of our modern maps of Central Asia, they would have gained much in accuracy.

THE KASHGAR MISSION.—Colonel Biddulph's paper having been read, Sir George Campbell traced the history of geographical discovery in Central Asia, and paid a high tribute to the scientific attainments of Dr. Stoliczka, by whose untimely death we had been deprived of much valuable information. The Rev. J. Edkins, late of St. Petersburg, said that Eastern Turkistan was permeated with Chinese ideas, and would no doubt be recovered by China, unless England and Russia combined to prevent it. M. de Khanikof congratulated English travellers upon the success they had achieved in the face of difficulties of no mean kind. Mr. Ravenstein drew attention to the work performed by native explorers, and placed before the meeting a manuscript map of the country between Peshawar and the Upper Oxus, based upon surveys made by a native in the employment of the government of the Punjab, and now the property of Dr. Leitner.

PALESTINE EXPLORATION FUND.—At the request of the Geographical Section 100*l.* have been granted by the Council to this fund for the purpose of promoting the survey of that country, and particularly of ascertaining the difference of level between the Mediterranean and the sea of Galilee.

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IN addition to the papers read before the Geographical Section, several of a kindred nature were brought before other sections, and we deem it of some interest to furnish abstracts of these likewise.

Charts on Gnomonic Projection. By G. J. MORRISON.

The author points out that Mercator's charts give very inaccurate ideas of the real distance between any two distant ports: for instance, a straight course on one of those charts between Hong-Kong and San Francisco would be 470 miles longer than a great circle route. He said that sea captains sometimes make short voyages in spite of their charts, rather than by their aid. For these reasons he advocated the substitution of charts on gnomonic projections. In a map sections of the globe have to be represented on a flat surface, hence most maps embracing large areas give inaccurate ideas of the most direct routes. For instance, the direct route to Calcutta from England is popularly supposed to run through Constantinople, whereas it really passes through Russia, far to the north of the Black Sea.

On the Cause of the Progressive Motions of Cyclones and of the Seasonal Variations in their Paths.

In his paper on the above subject, Dr. Ashe pointed out the importance of arriving at a knowledge of the probable path of cyclones over the ocean, and of the variations which had been found to occur in their paths at different seasons. To trace their paths we must first arrive at a knowledge of the causes of their onward progress. The author resolved these causes into two classes: those which were inherent in the cyclone itself, and those which depended on the trade-wind, or other general current, within which the cyclone might originate. The resultant of the paths due to these two causes would give the actual path along the surface of the ocean. Now, cyclones were found to move directly to polewards when they were near the tropics, where they were free at once from the influence of the trade-winds and that of the counter-trades, and the author therefore considered that this was the direction of path belonging to the cyclone itself, which he accounted for by supposing that the eastern half of the cyclone had an excess of motor force over the western, in consequence of the air which it drew in from equatorwards adding to the speed of the wind's motion, since it moved eastward faster than the centre, while air from polewards retarded the motion of the western half of the cyclone, since it moved more slowly to eastward than the centre. When the motion of the trade-wind to N.W. in the southern hemisphere, and to S.W. in the northern, was added to the proper poleward motion of the cyclone, we arrived at the very path which observation had shown these cyclones to follow. Similarly, the motion of the counter-trades to N.E. in the northern, and S.E. in the southern hemisphere gave, when combined with the poleward motion of the cyclone itself, the exact path observed to be followed outside the tropics. The difference in the force of the trade-wind at different seasons of the year would thus be seen to be the cause of the variations observed in the path of cyclones, and the results so arrived at by this theory were in strict accordance with the facts so observed. Hence the author hoped that a step might be considered gained by this theory towards a knowledge of the probable path of any given cyclone which a mariner might find himself involved in at sea.

On Cyclone and Rainfall Periodicities in connection with the Sunspot Periodicity. By CHARLES MELDRUM.

The paper commenced by stating that the catalogues of cyclones experienced in the Indian Ocean, from 1847 to 1873, submitted last year, indicated that during that period the number of cyclones in the space between the equator and 34° S. latitude, and the Mauritius of 40° E. and 110° E. was much greater in the years of maximum than in the years of minimum sunspot frequency. The author believes that there is a strong probability that cyclone fluctuation is consistent with a similar fluctuation of the rainfall over the globe generally.

The Absorption of the Sun's Heat-rays by the Vapour of the Atmosphere. By the Rev. F. W. STOWE.

The observations of solar radiation which were relied on in the paper, were taken with "blackened-bulb thermometers in vacuo" suspended 4 feet above the ground, the indicators of which, when compared with those of the ordinary shade thermometers, gave a measure of the intensity of the solar rays.

The absorption of the direct solar heat-rays by the vapour of the atmosphere is proved in several distinct ways:—

1. It is found that the elastic force of vapour is less on the ten days in each month on which radiation is most powerful than on an average of the whole month.

2. It was also found that N. and N.W. winds, which contain little moisture, are very favourable to solar radiation, whereas S. and S.E. winds are usually accompanied by much less powerful sunshine. The N.E. winds of spring, which are excessively dry, are also accompanied by intensely powerful solar radiation.

3. By frequent observations during cloudless weather, with nearly constant vapour tension, curves are obtained representing the daily variations in solar radiation produced by the changes in the sun's altitude, and consequent alteration of the length of the path which the beams pursue through the atmosphere. In fact,

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the sun's rays are more intense in winter than in summer, when the difference of altitude at noon is allowed for, because the absolute amount of vapour in winter is so much less. About 10 or 12 per cent. is the winter minimum of absorption of the sun's heat-rays, while the summer maximum equals or even exceeds 20 per cent.

On certain Protracted Inequalities of Atmospheric Pressure in the Indian Monsoon Region, and their relation to Variations of the Local Rainfall. By Henry F. Blanford, F.G.S.

The author draws attention to a fact disclosed by a discussion of the barometric registers for the last seven years, viz., that the abnormal peculiarities of relative pressure distribution, which may appear in any season, tend to last for many months, and in some cases throughout several alterations of the monsoons. Throughout variations of pressure, even when these are such as accompany monsoons, neighbouring regions are found to maintain a nearly constant difference of pressure which only decreases very gradually. In noticing the rainfall, he said that the heaviest was found to be in advance of the centre of the cyclone. A satisfactory determination of their relations cannot be obtained until the pressures in different Indian districts are better known.

On the Progress of the Geological Survey of Ireland. By Professor Hull.

In exhibiting the new index of geological signs and colours, which had just been prepared in the Geological Survey of Ireland, Professor Hull gave a short sketch of the origin and progress of the survey, observing that it had originated in 1832, with that of the late General Pollock, and his assistants, who had published the well-known report on the geology of Londonderry, Tyrone, and adjoining districts in 1843. With this report it had been intended to publish exhaustive reports on the botany, zoology, and mineralogy of the districts, and Mr. Oldham, afterwards the director of the survey, was appointed to undertake the last-named department. During the Government of Sir Robert Peel the idea of undertaking any other branch of natural history other than geology was abandoned, and in the year 1844 the surveys of the United Kingdom were detached from the Ordnance, and placed under the Woods and Forests. Sir Henry de la Beche was appointed the first Director-General, while the Survey of Ireland was under the direction of Captain (afterwards Colonel) Sir Henry James. In 1845 the Act of Parliament was passed, under which—the Survey Act giving them the right of entry on lands—Captain James, with a small staff of assistants, commenced operations in the vicinity of Dublin, and southward through Wicklow into Wexford. He was succeeded by Professor Oldham, who left in 1850, when the latter was appointed to the Geological Survey of India. Professor Oldham was succeeded in the directorate by the late Professor Jukes, who, with a slightly increased staff of surveyors, including the late Mr. Du Noyer and Mr. Kinahan, the present district surveyor, completed the survey of a very large portion of the south, centre, and west of Ireland. In 1855 Sir Henry de la Beche died, and was succeeded by Sir R. I. Murchison. On his death, Professor Ramsay was appointed. The districts recently completed are those of Connemara and West Mayo, by Messrs. Kinahan, Warren, and Symes; of the Morne Mountains, by Mr. Traill; the vicinity of Antrim, by Mr. Duffin; the Dungannon district, by Mr. Hardman; and that of Armagh, by Mr. Egan; together with other portions of Westmeath, Longford, and Mayo, by Messrs. Wilkinson, Cruise, and Leonard. These surveys are surveyed on the scale of 6 inches to a mile, and field maps, from 1852, were reduced and engraved on the Ordnance maps to a scale of 1 inch to the mile, which are published through the agents, both in Belfast and Dublin. These maps are not generally hill-shaded, but it is intended to publish all the geological details of the district north of a line drawn from Clewe Bay on the west to Dundalk Bay on the east on maps having the physical features shown by shading. The survey of the Dungannon coal-fields has just been completed, and the results are being prepared for publication. This is also true with regard to the Leitrim and Roscommon coal districts. At present a fresh survey of the Leinster coal field is being carried out. Great pains are also being taken to portray accurately the extent of the deposit of iron ore of County Antrim, and considerable advance has been made in the survey of that district.

The Koragars, a Leaf-wearing Tribe on the Western Coast of India. By W. J. Walhouse.

The author commenced by describing South Canara, the most northerly of the Madras Provinces, lying nearly midway between Bombay and Cape Comorin. Being posted at Mangalore, the head-quarters of the district, for several years, he often met with the people about to be described, the Koragars, a remnant now numbering but a few hundreds of the aboriginal slave castes, having this distinctive peculiarity, that the women wore aprons or screens of woven twigs and green leaves over their buttocks. In old times both sexes were allowed to wear only these leafy aprons for clothing; the custom was now confined to the women, and was an instance of how what was once a badge of degradation might become a cherished observance, for the leafy apron, though useless, being worn over the clothes, was still retained by the women, who thought that leaving it off would be unlucky. The people themselves were a very quiet and inoffensive race, small and slight, the men seldom exceeding five feet six inches; black-skinned like most Indian aborigines, thick-lipped, noses broad and flat, and hair rough and bushy. Their chief occupation was basket making, and they must labour for their masters. They lived on the outskirts of villages, and might not dwell in houses of clay or mud, but in huts of leaves called Koppas. Like many of the wild tribes of India, they were distinguished for unswerving truthfulness and the "word of a Koragar" was proverbial, and was always accepted. Numerous slave castes existed throughout India, and were regarded by their Hindoo masters with boundless contempt and loathing, curiously tinctured with superstition, for they were believed to possess secret powers of magic and influence with the old malignant deities of the soil, who could direct good or evil fortunes. Like all the slave castes and lower races, the Koragars worshipped Mari Amma, the goddess presiding over small-pox, and the most popular deity in Canara, represented under the most frightful form, and worshipped always with bloody rites. All the Hindoos believed that the Koragars have a language of their own, understood only by themselves; but it seemed doubtful whether this was anything more than an idiom or slang, such as was current amongst almost every caste and profession in India. They had, together with one or two other divisions of the slaves, a curious custom, scruple, or prejudice against carrying any four-legged animal dead or alive. This extended to anything with four legs, such as chairs, tables, cots, &c., which they could not be prevailed upon to lift, unless one leg was removed. As they all work as coolies, this sometimes produced inconvenience, and the only reason assigned for this prejudice was lest they should be treated as deformed. The author added that, on visiting Mangalore three years ago, after a considerable interval of absence the number of women wearing the leaf aprons behind seemed perceptibly to have diminished, and very possibly the custom might, in a generation or two, become extinct.

Sir Walter Elliott said that the practice of wear-

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ing leaves was by no means confined to this one tribe in India. On great festivals to Kali, the women, in fulfilment of vows, would walk in procession covered with leaves, and surrounded by their female friends.

General COTTON said that leaves were frequently worn, not as a sign of caste, but to save clothing. In many parts of India when the people were employed in baling water, or in irrigation, they made themselves leaf aprons. It was not the fact that there was an isolated race only using leaves for clothing. He rather questioned the story of the Koragars having been condemned to use the leaves as a servile badge. It was founded on mere supposition, and a legend of their own.

On the Distribution of the Races of Man inhabiting the Jummo and Kashmir Territory. By FREDERICK DREW, LL.D., F.G.S.

The author first describes the races found in the basins of the Chinab and the Jhelam Rivers, viz., the Dogras, Paharis, Kashmiris, and Chibhalis. These races are of Aryan origin, and, though differing from each other, have all a countenance of a distinct Aryan type. The Dogras occupy certain portions of the outer ranges of the Himalayas, from the foot of the hills, at a level of 1000 feet above the sea, to heights of 3000, and perhaps 4000 feet. They are a race of fair height, but slim; active, but not powerful. They have well-formed and rather delicate features. Their complexion is of a brown colour, like that of the almond husk but rather darker. They are divided up into castes, in great part corresponding with those found among the other Hindus. The Paharis occupy the higher mountains next beyond; their dwellings are at heights of from 3000 or 4000 feet up to 9000 or 10,000; they are, moreover, in some cases situated between mountains of much greater altitude. The men of this race are stronger and of a more powerful frame than the Dogras, but still they are active. They have good features, thoroughly Aryan, a good brow and a decidedly hooked nose. Both in appearance and disposition they are decidedly different from the Dogras; their habitation among the hills where snow falls has been the cause of many differences, both in their customs and in their nature. In the Kashmiris the differences existing between the Dogras and the Paharis, at all events as far as physique is concerned, are carried further. The Kashmiris have a very powerful frame, broad shoulders, muscular backs, and strong limbs. In feature they present probably the best form of the Aryan tribe of countenance. They commonly have a high and wide forehead, a square brow, and a well-shaped nose, which in the older people becomes curved. The Kashmiris occupy their own enclosed valley of Kashmir, and have spread from it somewhat and formed isolated colonies both in the neighbouring hills and at a greater distance. The Kashmiri language is one of a group of languages or dialects. The Paharis speak not one, but several dialects. In language as well as in physique a passage more or less gradual can be traced from the Dogras through the Paharis to the Kashmiris. By far the larger portion of the Dogras are of the Hindu religion and the Paharis are almost entirely of that religion. The Kashmiris were originally Hindus, but nine-tenths of them are now Muhammadans. The Chibhalis are all Muhammadans, who have separated from the others, and might now be called a distinct race. The Chibhalis extend from the outermost hills between the Chinab and Jhelam Rivers northward over mountains of 8000 or 10,000 feet in height. To the north and north-east of the snowy range of mountains they found a race of Aryan origin, the Dards, who came into these territories from the north-west, their furthest point in a southerly direction being four days' march from the capital of Kashmir. The Dards are tall men, broad shouldered and well proportioned, bold and active mountaineers. Their religion is now for the most part Muhammadan. The author also described three sub-divisions of the Tibetan race, viz., the Champas, the Ladakhis, and the Baltis, found adjacent to the other Aryan races already mentioned. The paper was illustrated by a very clear and intelligible map, and also by photographs.

The Peoples between India and China. By Sir GEORGE CAMPBELL.

The author said that from his official position, he had an opportunity of seeing a good deal of the people in India and China, and hearing a good deal about them. He had collected and printed a large number of languages of their tribes, and had classified them as far as they could be with reference to their various affinities. The eastern tribes lying between and partly covering the Himalayas he described as possessing in their language considerable affinity to the proper Chinese. Many of the people about Darjheeling spoke dialects of the Tibetan language, but their civilisation was distinctly Chinese. The Gara tribes had very little civilisation, and what there was was of the Chinese type. They, in common with the Chinese, regarded drinking milk with horror, although they had no objection to eating puppy dogs. Their language, together with that of the people on the Hill Tipporeh, was a dialect of the Couch, a language spoken by a very large group of people occupying the forests at the foot of the Himalayas and the lower hill south of the Himalayas. In Upper Siam the people were clearly Siamese, a most civilised race, with a language and literature of their own. Between the British possessions and Chittagong and the territories of the King of Burmah was a very considerable hill tract occupied by people of whom something had recently been discovered. The Looshai expedition enabled them to learn a good deal about a large tract of country inhabited by a people called Kooke, of whom the Looshais were a tribe. These Kooke tribes were undoubtedly a Hindoo-Chinese tribe, speaking a language different from the Siamese and Burmese, but still remotely affined to that group of languages. Between Upper Burmah and Upper Siam were a large group of Naga tribes, a very fine and independent race, remarkably like the finer class of Red Indians. The Singpos inhabit the country at the upper extremity between Siam and the Chinese empire. Sir George Campbell then described the Khassia tribes, and created considerable amusement among the audience, which was largely composed of ladies, by his account of the "women's rights" which are exercised by the female portions of the tribes. It seemed that amongst the Khassias the woman is the head of the family, and the property descends in the female line instead of the male. The ladies there exercise a pretty free right of divorce. The lady lives in her own house and on her own estate; she proposes to the husband and marries him, and if she does not like him he is speedily discarded and another substituted. One result of this great freedom of the women is that they do by far the larger share of the work. A traveller passing through the country has relays of women provided, who carry him on their back in a basket shaped like a strawberry pottle with a piece cut out. The men, feeling themselves to be the weaker vessels, were not responsible for the maintenance of the family, and naturally took it somewhat easily. If ladies of this country were prepared for the reversal of the position of the male, perhaps the men might be induced to allow them to take the lead.

On Modern Ethnological Migrations in the British Isles. By Dr. JOHN BEDDOE, F.R.S.

The author points out that in Britain, as in other countries, there is a constant stream of population towards the capital, flowing from all parts of the country, and comprising a considerable portion of the upper and

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middle classes. Elsewhere, in Britain and in Europe generally, the rule was that migration took place from poor to rich, from ill-employed to busy and prosperous districts, and instances to the contrary were comparatively rare, or of little importance ethnologically. In Scotland there were two currents of migration, one southward and south-eastward and towards England, the other towards Glasgow. The vigorous, ambitious, and prolific race of the south-east of Scotland was already scattered all over the world. Such names as Scott, Turnbull, Kerr, Douglas, Irving, and Bell afforded sufficient evidence of this; and Ireland swarmed with Armstrongs and Grahams, not all of them, it was true, descendants of voluntary immigrants. The large towns, however, were the great centres of attraction, and the more Celtic of the people furnished the masses attracted. Thus, Glasgow, from the rapid influx of Irishmen and Highlanders, was becoming as Celtic a city as Dublin or Belfast if one might judge by the evidence of features and family names. With Edinburgh the case was otherwise, though there even the Celtic element was strong in the lower classes, and the agricultural population around had been displaced by Irishmen to a considerable extent; still the difference of physiognomy and complexion between the street population of the two cities was very well marked. The case of Liverpool was much the same as that of Glasgow. In Manchester and Newcastle, and in most of the colliery districts of the North of England, Irish blood abounded, while the national Irish characteristic of natural eloquence came out in a very curious way, the spokesmen and leaders of the colliers and ironworkers in their trade disputes very frequently bearing Irish names. In London Irishmen were not relatively numerous, and Bristol furnished an example of the small importance of mere proximity; for notwithstanding the easy communication with populous Munster, the Irish element did not exceed three per cent. In Ireland itself Dublin was, of course, formerly—but Belfast now—the great focus; but in many smaller towns notable prosperity, whether engendered by political or social causes, or by the practical genius of a Teutonic colony, had in the end attracted the neighbouring Celtic population, so as almost to redress the ethnological balance. Of this Bandon and Enniskillen were good examples. The ethnological changes were, however, in a great degree limited to towns and to iron and coal districts. In some rural districts of Ireland and Scotland the Celtic element did undoubtedly encroach on the Teutonic, but it was very gradually and slowly done, and the day was yet far distant when the landmarks of race would be obliterated. And even in the towns the rate of progress of this movement could not be very accurately calculated so long as they were without data to show the relative potency of acclimatisation and degeneration determining the respective death rates of the different elements of urban populations.

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DRESDEN GEOGRAPHICAL SOCIETY.

The work of this scientific body deserves to be much more extensively known than it is. Amongst the varied assortment of papers which are contained in the annual journals since 1862, the date of the foundation of the Society, there are many of exceptional interest, which we regret that want of space prevents us doing justice to. The Society numbers 299 ordinary and honorary members and 41 corresponding members, among which however, we perceive but few foreign names; it would be a decided advantage to enlist the co-operation of members of other Societies abroad, who would contribute information and diffuse a knowledge of the doings of the Dresden body. The regular meetings are monthly, but weekly meetings are also held for the purpose of reading papers of minor importance. There is, moreover, a section of the Society charged with the special duty of watching over the mode of instruction and educational appliances used in teaching geography and kindred subjects. This section also meets occasionally to consider any new scheme or proposals submitted to it.

The Fisheries and Seal-Hunting in the White Sea and Northern Ocean.

This paper, contributed to the *Journal* for 1873-4, by M. A. Schultz, President of the Astrakhan Fisheries, affords a good deal of information on an important industry, of which but little is generally known. Most of the fishing villages, and all the largest ones, are situated on the south and south-west shores of the White Sea. Along the shores of the estuaries of the Petchora and Mezena Rivers there are a few villages and huts studded at intervals. Along the Murmanian coast opposite, which stretches as far as Norway, there are no regular fishing settlements, but only huts and storehouses left untenanted during the winter. About 5000 fishermen repair thither annually from the shores of the White Sea, and from April to the middle of August take part in the cod-fishery off the coast. Only the better class and such as can afford well-equipped schooners venture out as far as Novaya Zemlya. The annual value of the fisheries amounts to about 2,000,000 roubles, being considerably less than that of the Caspian. This is mainly attributable to the severity of the climate and to the paucity of sustenance for the fish brought down by the rivers. The villages are so far apart that each conducts its operations unaided. As far as the methods of catching and preparing the fish are concerned, the Astrakhan fishermen are far in advance of their northern brethren, who generally prepare their fish very carelessly, always excepting the herrings, which are salted by the monks of the island of Solovezk, and the salmon caught in the Dvina and Onega Rivers. The fishermen are not unacquainted with the more careful modes of preparation, but, in the first place, there is not much prospect of a market for the better qualities of dried fish, and, secondly, they are unwilling to give up traditional customs.

In a list of the fish which frequent these seas and rivers we perceive the following:—Perch, cod, pike, salmon, and herrings—the last two alone being, however, of economical importance. Two kinds of herring are caught, one about 6 to 7¼ inches in length, and another of a larger size, both sorts being always to be found in the White Sea, and not resorting there temporarily. Those caught in the autumn are the fattest. To catch them they make use of drag nets, from 16 to 35 fathoms long, which require six men to work them. The fishing season begins about the middle of November and lasts till February. The net is plunged beneath the ice, and by means of a rope dragged up several times a day, while at night it is usually left in the water. A good haul will bring up about a hundred thousand fish, and as about 750 of these nets are at work all at once off the village of Soroka (the chief place) alone, some idea may be formed of the extensiveness of the fishery. In autumn the nets are longer, and the boats cast their nets in pairs. The nets which are dragged in to land are from 50 to 100 fathoms in length, and about 5 fathoms high, and with all fittings complete, cost about 150 roubles each. At the mouth of the Dvina River cylindrical or sack-shaped nets of a smaller size are used, while in December and January basket traps are not unfrequently set at the depth of about 3 fathoms below the surface. The herrings are not cleaned out, but are laid in rows and salted and then packed in jars, while in some villages they are smoked.

Of salmon, there are three species caught in these regions, the smallest weighing about five pounds, and the largest, which mostly come from the Dvina and Onega Rivers, as much as half a pud (20 lbs.). Two of the above-mentioned species spawn in September, and pass the following winter in the river, coming down to the sea in the spring, while the other species, which favours the clearer rivers, passes a whole year in them before

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spawning. Weirs are erected zigzag fashion across the rivers with small apertures in them, opposite to which traps are set. Nets of different sorts and basket traps are also used, and in the dark autumn nights the salmon are not unfrequently speared with five or seven pronged forks. After being cleaned and salted the fish are exported to the interior of Northern Russia and to Siberia. Cod, flounders, and gadus are also salted for export.

When the nets are fastened together for a day's fishing, the united length often exceeds 6 miles, and the haul is a lengthy operation. The heads of the cod when caught are chopped off, while the bodies are cleaned and salted and exported to Archangel, whence they find their way to St. Petersburg, and to the Vologda and Olonez Provinces. The heads and entrails are thrown away in Russia, but in Norway a substantial amount is realized by converting them to use as fish guano.

From many of the coast villages vessels sail forth between July and September to Novaya Zemlya in quest of seals, walruses, sea-bears, and a small species of salmon. About 100 seals are annually caught with nets; walrusses are harpooned from boats or from the shore. A large walrus weighs usually 100 puds (4000 lbs.), and in such case the captors content themselves with bringing away the tusks, skin, and fat, the latter of which weighs about 560 lbs. Bears are shot, and if only wounded, receive the *coup de grace* from a hunting knife. They yield about 140 lbs. of oil, which is twice as valuable as that of the seals.

Dolphins are also caught in abundance both by nets and by harpooning, for the sake of their fat, which yields excellent oil. Along the eastern shore of the White Sea there is an extensive hunting of seals going on from the latter half of the winter or the beginning of spring till May. The hunters clothe themselves in reindeer skins, with a linen cloak and hood drawn over, which makes it hard for the animals to distinguish them against the snow. They frequently bivouac for days on the ice, using their boat as a sort of hut, and this renders seal hunting very dangerous, as the ice is frequently in motion. On the west coast the hunters use reindeer sledges, on which they pack the seal skins and so bring them home.

Whales are not unfrequently left high and dry on the Murmanian Coast by the retreating tide, and the Lapps have then a rich prize before them. In most of the villages on the shores of the White Sea there are boiling huts, and here the work is rapidly done. The quantities of oil exported annually from Archangel vary a good deal. In 1856, after the close of the war, it amounted to about 1080 tons, but since then it has decreased. The greater portion goes to England and Hamburg.

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FRENCH GEOGRAPHICAL SOCIETY.

Bulletin for May.

M. DUVEYRIER contributes an abstract of Major Roudaire's recent paper on the creation of an inland sea in Algeria, which is further illustrated by a sketch-map showing the probable extent of the sea in question. Our readers must know, however, that this splendid scheme has opponents. M. Edmond Fuchs, a mining engineer, deputed to examine the mineral wealth of Tunis, has paid a visit to the eastern extremity of the isthmus of Gabes, and has formed the conclusion that the inland lake or τριτωνιτη λιμνη of Herodotus was always separated from the Mediterranean in historical times by a belt of limestone rocks, about 200 feet in thickness. M. Fuchs also brought forward other objections, which he expounded at length at a recent meeting of the Academie des Sciences.

The report of the committee formed for the award of the annual prize then follows. They notice the claims of Schweinfurth, Nachtigall, and Ney Elias, to distinction for their important discoveries, but Nachtigall's work being incomplete, and no official account of the other two having appeared at the time the report was drawn up, the committee reserved their verdict on their labours.

Turning to the Far West, the explorations of M. Pinart in the Alaska Peninsula and the Aleutian Islands, attracted the attention of the committee. Alaska belongs to Russian America, geographically speaking, but it was ceded to the United States in 1867. The Russians had discovered it and carried on a trade in furs with the inhabitants, but it had never been properly surveyed. M. Pinart, with instruments supplied by the Smithsonian institute in Washington, determined the height of two volcanoes, Pogrumnoi and Chichaldin, the latitude and longitude of sixteen places, and the latitude only of two places. The minerals and rocks collected by him will introduce modifications in the geological map of Alaska, published by Grewink. The zoological remains have formed the subject of special papers in Paris, the tooth of a fossil elephant in particular exciting interest, for it appears that the melting of the snow, near lake Ilamna, has year by year revealed the existence of extensive remains of the *elephas primigenius*. Many of the articles brought home by M. Pinart, such as stone hatchets, javelins, arrows, dresses, sculptured ivories, masks, &c., shed considerable light on the manner and customs of the people. But it is in ethnology that the richest harvest was reaped. M. Pinart has incontestably proved that the Esquimaux inhabiting this region, are of the same stock as those of Greenland and Baffin's Bay. From their legends, traditions, and songs, he is of opinion that they originally came from a country in the south of Asia, where cold and violent storms, as well as the art of navigation, were quite unknown. After being driven out by their kinsmen, they wandered eastward; a portion settled in the Aleutian Islands and the remainder crossed Behring's Straits, and thence divided into two branches, one branch keeping along the northern shore of North America and peopling Labrador and Greenland; the other stretching along the western coast of the continent as far as Mount Elias. Three races inhabit the north-west extremity of America: the Tinnai or Chippewayan race which extends along the Rocky Mountains as far as the desert of Arizona; they dwell inland on the banks of the great rivers, and subsist by hunting; the Esquimaux, who live mainly on the coast and are fishermen; and, lastly, the Aleutians, who have much in common with the Esquimaux.

In consequence of the great value and variety of M. Pinart's investigations, the committee have awarded to him the gold medal of the Society, and two minor medals to MM. Vivien de Saint-Martin and Emile Levasseur, for their works entitled *Histoire de la Géographie* and *Carte murale de France*, respectively.

Other articles in the *Bulletin* are a sketch of the Kingdom of Siam, by the late Francis Garnier, an account of the finances of the Society, a few reviews, and notes of geographical events.

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THE

GEOGRAPHICAL MAGAZINE.

NOVEMBER, 1874.

THE OXUS EXPEDITION.

FROM Major Herbert Wood's interesting communications to the *Daily News*, Colonel Stoletof's letters to the *Invalide Russe*, and a few other sources, we gather details of the progress of this Expedition.

The 'Perovski' steamer, with the members of the party on board, and a barge in tow, left Fort Kazalinsk in the early part of June, and after crossing the sea of Aral endeavoured to ascend by the Ulkun Daria or middle branch of the Amu, in preference to the Taldyk or Yani Su * channels, which lie westward and eastward respectively. The middle channel debouches into the sea by two mouths, the western of which is called Kitchkene-Daria, and, in 1859, when Admiral Butakoff† explored the southern part of the Sea of Aral, this channel conveyed the main body of the waters of the Oxus. But an important change has since occurred in the course of the stream, and now the navigable channel will be found to lie (as it did in 1848 and 1849) in the Yani-Su to the eastward. The 'Perovski,' however, being ignorant of this circumstance, proceeded up the Ulkun, taking frequent soundings, and making observations on the set and rapidity of the current. She traversed the Ulkun and the affluent which connects it with the Sarykul Lake, and arrived at Kara Tau, 70 versts from the mouth of the river. Here some of the party made their way overland to the fort of Shimbai, which is situated about 45 versts from the landing-place, and the rest ascended the river by native boats to Nukus. This mode of procedure was rendered necessary by the shallowing of the river, and the same circumstance convinced the commander of the 'Perovski' that it would be impossible to proceed further with his vessel by this route. He accordingly retraced his steps to the sea, and, turning eastward, coasted along the southern shore, making a detailed examination of its sea face, and entered the Yani-Su on the 29th of July. Admiral Butakoff, in 1859, ascended this arm for 40 or 50 miles, but was then stopped by a sort of dam, formed by a ridge of limestone rocks. This ridge has now completely disappeared, but its former existence may be traced in the presence of the Daukara Lake, a huge tract of swamps and tall rushes, about 1500 square miles in extent, along the eastern edge of which flows the Kuvun Yarma, as the channel is called where it first branches from the Oxus. The Yani-Su, except in one or two places, proved to be easily navigable. It is 100 feet wide at the mouth, with a general minimum depth of 15 feet, and a moderately quick stream. On reaching lake Daukara the water shallows to an average depth of 7 feet, the course becomes awkwardly tortuous, and the velocity of the waters in the bends increases to 6 miles an hour, while higher up in the Kuvun Daria the current at the bends attains a rapidity of between 7 and 8 miles an hour, and the width increases to 400 feet.

This eastern channel, about 200 miles in length, was successfully ascended by the 'Perovski,' which reached the main stream of the Oxus on the 5th of August. But it must not be assumed from this that the eastern arm will always be navigable. The Yani-Su itself may possibly remain so, the quantity of silt brought down by the stream being mainly deposited in the Daukara Lake, where, with occasional dredging, a channel might be kept open. But in Kuvun Yarma there are so many diverging streams, with heads increasing in size year by year, that a division of the waters may take place any day, and the navigation of the Oxus thus become an impossibility. Moreover, a trial must be made during the dry season before any definite conclusion can be formed.

However, it is a great achievement for the 'Perovski' to have ascended as far as Nukus alone, not to speak of her further progress as far as Petro-Alexandrovsk. Above this latter place difficulties cease, and Major Wood thinks there is nothing to hinder steamers ascending as far as Charjui (63° 20′ E., and 39° N. about), or even perhaps Khojah Saleh in Affghanistan. The great obstacles are the inequalities of the river, which would necessitate a staff of local pilots, and the want of fuel. As a rule, the navigable channel will generally be found along the right bank, in accordance with the usual law of hydrology, which makes rivers flowing north and south follow the direction of the rotation of the earth, and hug their eastern banks. The left is pretty uniformly shallow, and in September and October, silts, shoals, and islands covered with waving grass and tamarisk jungle, interspersed with low willows, are formed in this part of the river; being mainly caused by the flow into the canals which branch off from the left bank. The second difficulty, scarcity of fuel, is met at present by burning the

* Also called Yani Daria, but not to be confounded with the channel flowing south-west of the Syr-Daria, which Sir Henry Rawlinson maintained was the old bed of the Jaxartes. The views of Sir Henry (which were opposed, however, by the late Sir R. Murchison and Colonel Yule) have recently received corroboration from Mr. McGahan's researches on the occasion of his journey across the steppes.

† The sketch map by Admiral Butakoff, reproduced in the 37th volume of the *Journal of the Royal Geographical Society*, is still the most trustworthy one of the delta of the Oxus.

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gnarled stems and roots of the Saxaul *(Haloxylon ammodendron)*, which is common enough on the Syr Daria, but of which a limited quantity only can be procured at Nukus, at 18*s.* a ton. This scarcity of fuel delayed the steamer on her upward journey. At Petro-Alexandrovsk the wood is still more difficult to procure, and this will probably give an impetus to the working of the coal mines of Turkistan, the coal of which goes twice as far as Saxaul.

The Russians hold at present three posts on the Lower Amu, and a fourth is being built. Shimbai, in the delta, is held by a small force of Cossacks, armed with sabre, rifle, and bayonet, and mounted on sturdy ponies; next comes the new fort of Nukus, which will be soon ready for occupation, and is surrounded by walls about 15 feet high, forming a square about 360 feet a side, and defended by a ditch all round, and four bastions for light artillery at the angles. A little further up is Nukus proper, a temporary station, inhabited by 1000 or 1200 officers and men; and 120 miles from the mouth of the river is Petro-Alexandrovsk, the principal Russian post of the Amu Daria district. The bulk of the troops here consists of a battalion of riflemen, and one of the line, occupying small barracks in a fine walled garden. Along two sides of it are wet ditches, and bastions have been erected at the angles, with some 12-pounders in them. A small town is springing up at a short distance from one side of the fort. There is talk of the Turkmen intending to cross the frozen river in the winter, and make an attack, but the present commandant is not one to be caught napping.

With a keen appreciation of the benefits to be derived from a study of the meteorological conditions of a newly-acquired country, Colonel Ivanoff has already established observatories at Nukus and Petro-Alexandrovsk, and, under the superintendence of the chief observer, M. Dorandt, the buildings were completed by the beginning of August, but some preliminary observations were taken early in July. Ten subalterns were placed at his disposal, and these showed such intelligence and aptitude for the work, that in a very short time they were able to render good service. The observations proved that the weather here in July is clear and healthy, the maximum being 95° Fahrenheit in the shade, and the minimum 59°.

The banks of the Amu, for about 50 miles above the delta, have little or no cultivation along the right bank, but above the Sheikh Jeli hills, timber and cultivation increases, and for more than 100 miles along the left bank are groves of mulberries, planes, and other trees, amid which are square fort-like enclosures of *pisé* walls, containing the homesteads of the agriculturists. In the open ground are fields of wheat and lucern, which alternate with millet, rice, or maize, while the orchards contain apples, pears, peaches, apricots, and melons of the finest quality.

The navigableness of the Oxus confirms the views of Sir Alexander Burnes, and, in face of the opposite opinion expressed so emphatically by Vámbéry, is a proof of the critical acumen of Colonel Yule, who supported his belief mainly on the traditions of its having formed once a commercial highway between Upper Baktria and the Caspian.

M. Severtsoff, in charge of the natural history section, has furnished some particulars of his journey in company with the botanist, M. Smirnoff, from Kazalinsk to Nukus along the shore of the Aral, with the object of investigating the circumstances attending the desiccation of that sea. He found that south of the Syr there are, for a distance of 67 versts, extensive alluvial deposits which at first present the appearance of a level expanse of dark loam studded with clumps of withered canes and tamarisks, and further south merge into sandy hills overgrown with thin grass. The bed of the Syr Daria appears to be subject to erosion, as it has ceased to cover lands which M. Severtsoff noticed, in 1857, were inundated at low water. He also remarked that the beds of former *aryks* or irrigation canals were above the level of the river. On turning his attention to the fall in the Aral Sea, he found that bays which deeply indented the sea coast are now completely dried up; shallows are forming islands; islands are becoming part of the mainland; the old coast-lines being distinctly marked by the different belts of vegetation growing on its borders.

Of kindred interest is the work of Colonel Tillo and his assistants, who, after comparing instruments at Pulkhova Observatory, commenced on the 25th of July to carry three lines of levels from the western shore of the Aral Sea to the eastern side of the Caspian. According to latest advices the work had proved exceedingly fatiguing, but by dint of twelve hours a day hard work they had already advanced half way.

The object of these various labours is the establishment of water communication either by means of the old bed of the Oxus or else a canal between the Caspian and the Oxus, and thence, if it should prove feasible, in a north-eastern direction, so as to meet the Yani Daria and thus effect a juncture with the Jaxartes. This project which would unite the heart of Russia with Central Asia by means of an unbroken water-line is one the grandeur as well as the political importance of which are sufficient to make us look for further intelligence with the keenest interest.

THE YARKAND TRADE.

THE *Gazette of India* of August the 8th, upon the report of the Commissioner for the development of the Yarkand trade, contains some important remarks by the Lieutenant-Governor of the Pánjab.

It appears that the value of the trade has been all along shown as more than double what it really was, by the simple expedient of reckoning twice over a bale of goods entering the district of Ladakh from one side and leaving it at the other—a method of calculation, which, as the Lieutenant-Governor remarks, "is perhaps likely to mislead." Thus, "the total value of the trade with Eastern Turkistan—though the greatest on record—amounted last year to less than 60,000*l.*, an amount which must be considered altogether insignificant. It is true that the sum total of imports and exports by the several routes increased in value from 158,480*l.* to 177,672*l.*; but the imports and exports" (through Ladakh) "being the same goods, the value of the transit trade is really only half the total shown above." The Lieutenant-Governor further points out that this "altogether insignificant" result represents all that the whole fostering power of the Government could do;

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"though the development of trade between Yarkand and British India has received the careful attention of the British Government for upwards of six years, though transit duties have been abolished" (by the Maharajah of Kashmir, whom the British Government reimburses therefor), "and special officers appointed to watch over the interests of the traders"!

The gross value of this trade (statistical and actual) is as follows:—

	Statistical.	Actual (deduced).
1863	£24,000	£8,000
1864—1866	10,000	3,400
1867	55,000	20,000
1868	104,000	35,000
1869	129,000	45,000
1870	155,000	56,000
1871	125,000	45,000
1872	160,000	55,000
1873	178,000	60,000
	£940,000	£327,400

We have not any statistics of the outlay which has produced this result; but the expenditure on deputations and missions alone—those of Captain Grey, Mr. Shaw, and Mr. Forsyth—must have been great; the yearly expenses on the route—the Trade Commissioner and his establishment, the Government mule train, repairs and maintenance of roads and buildings—must be a heavy charge; but the only item of which we have any data is that of "construction of roads," regarding which the Lieutenant-Governor makes some suggestive remarks. It appears that of the three portions of the Yarkand road lying south of the Karakorum Range, the portion in Ladakh yet remains to be taken in hand, but that from the Ladakh boundary to the head of the Kangra Valley "an excellent hill road has been made, suitable for mules and possibly for camels, with bridges, bungalows for travellers, and supply depôts." Finally, an "enormous sum has already been spent, and is being spent in the construction" of two cart-roads in the Kangra Valley itself. One of these "has already been completed at a large cost, connecting Palampur with the railway at Jallandhur, a distance of about 117 miles"; and His Honour quotes the opinion of the tea planters (the persons most interested) "that this line of communication is amply sufficient for all trade requirements."

Nevertheless, another "costly road" is being constructed for a distance of 65 miles connecting Palampur with the plains *viâ* Pathankot. This is all complete except three bridges over mountain streams, estimated to cost 32,000*l.*, respecting which Sir Henry Davies observes:—"If the Government of India is prepared to contribute from the Imperial exchequer the sum required to complete the bridges, the work will be taken in hand without delay; but in His Honour's opinion, so large an expenditure would not be justified by the prospects of the development of Central Asian trade *viâ* Kangra, Kulu, and Lahoul."

It must be remembered that the road from Lahoul to the Karakorum Range (about 150 miles) has yet to be constructed, and that, as pointed out by Sir H. Davies, when all the arrangements within our border are completed there still remains the worst part of the obstacle to this trade to be overcome. "The greater our experience of the routes between India and Yarkand, the greater do the difficulties appear in the way of establishing a satisfactory trade-route—owing to the length of the journey, the enormous altitudes to be traversed, the arid and unproductive character of a large portion of the country, the absence of population, and the deficiency of carriage and supplies. The expedition of last year, though aided by all the influence of the Government officials of British India and Kashmir, met with no small difficulties, and taxed the resources of the country, both as regards the carriage and supplies, to the utmost. If such were the case with an expedition proceeding with all the prestige and advantages of an imperial embassy, the successful performance of the journey by large caravans under less favourable circumstances must be considered problematical." When we observe that of the exports from India to Yarkand, in 1873, exactly half stuck fast in Ladakh till the following year, for want of carriage; and that the only remedy the Trade Commissioner hopes for is that in future Indian cattle will be taken the whole way (over a route the terrific difficulties of which have already destroyed the Yarkand carriage, and caused the above-mentioned failure); we may safely concur in the Lieutenant-Governor's opinion of the "necessity for caution in embarking in mercantile enterprises in regions so distant and inaccessible," where "formidable competitors for trade in piece goods and other articles of English merchandise are already in possession of the field, while the population of the country, though well-to-do, is scanty."

Let us suppose, however, the roads all made, carriage plentiful, grass and water provided on the eight marches where these necessaries are almost non-existent, the fearful distress of crossing elevations of 18,000 feet in some manner mitigated, what will all this avail if China reconquers her revolted provinces, or if, like the rest of Turkistan, they come under a Russian protectorate? In the first case we revert to the state of things antecedent to the Muhammadan rebellion, when intercourse was as completely cut off with Chinese Turkistan as with Tibet. In the second, we are met by heavy protective duties especially imposed, as at the present moment upon the Oxus, to retain for Russian commerce the command of the Central Asian market. Is either event impossible? Are the assumptions even improbable? Are we likely, or able, to interfere in either case? China is steadily and surely recovering herself. Chinese pertinacity has availed to crush the internal Muhammadan rebellion and the Panthay revolt; it is subsiding the Tungan rising; will Chinese pride leave the recovery of Kashgar and Yarkand unattempted? Again, may not cause of quarrel arise between the Amîr of Kashgar and Russia, as between those of Khokand, Bokhara, or Khiva and the same empire, and with the same results? Again, the Amîr is not young, the provinces he has erected into a kingdom were districts before, and are only held together by his iron hand. His death will be the probable signal for disruption and anarchy, with the certain result of the annexation of the various provinces to either Russia or China.

But there is a branch of Central Asian trade, one shortly described in the February (1874) number of *Ocean Highways*, on which a *moderate* expenditure would be immediately reproductive. A hardy commerce which has existed for a century under the most

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discouraging circumstances (instead of being a recent creation of our own), and the value of which by the Gomul route alone was considered by the Lieutenant-Governor of the Panjáb in 1871 to be not over-estimated at half a million sterling (actual, not statistical), and to be then considerably depressed from various easily remediable causes. The total value of the trade by all four of the great routes into Affghanistan is at least a million sterling.

What has been done by the Indian Government to develop a commerce of which the germ (if an existing trade of 1,000,000*l.* can be called a germ) displays such exuberant vitality as to defy all the blighting influences detailed in *Ocean Highways*, and in the India House Report of Indian progress for 1872? Emphatically *nothing*. The profits of the trade are such as to attract constant accessions to the ranks of the Povindah merchants from among the more venturesome mercantile spirits of the Indian frontier—notwithstanding the exactions and losses described in *Ocean Highways*, and the efforts of the Russians to exclude Indian and British products from Turkistan. It would seem that every political and mercantile consideration would lead us to take advantage of such an opening, and to adopt measures to develop it, somewhat similar to those already described in the case of the Yarkand trade. The abolition of harassing imposts, and the prevention of annoyance and oppression of the traders *en route*, could be negotiated as easily and cheaply with the Amîr of Cabul as with the rulers of Kashmir and Yarkand. No physical difficulties have to be overcome; but if the British Government wished, the Amir could and would, in accordance with his undertaking at Ambala, in 1869, improve the roads. The traders have their own arrangements, and require no kind of assistance in the matter of carriage or supplies.

The real and only great difficulty of the routes is their insecurity on account of the turbulent tribes through which they pass. The mountaineers want payment for the right of way, and they take it sword in hand. The evil is one peculiarly easy of remedy by the combined action of the British and Cabul Governments. The plan proposed is to protect the disputed portion of the main (called Gomul) route (that immediately upon the British border), by posts at each stage, held by small parties of the very tribes to be restrained, members of which will escort the caravans from post to post. The posts would be paid by the British Government from funds raised by a small tax which the Povindah merchants already pay at the Indus, the proceeds of which have been hitherto credited to the general revenues; but, besides this advantage, the tribes would receive from the merchants themselves certain pass dues, at a tariff fixed by the British Government. These posts would be supported and watched by a detachment of the Cabul troops, conveniently posted to command the route, and would be supervised and commanded by a selected frontier chief, appointed Pass Warden on the part of both the governments.

Practical, cheap, and simple, as these measures are, and evidently certain as they are to develop a trade which is at present dwarfed by the impossibility of passing through to India, save by collecting the successive caravans till they form the strength of an army, and can push through the passes by main force; they still hang fire. Whether it be advisable or not to spend enormous sums on creating a trade with Yarkand, it must certainly be so to lay out 2000*l.* a year to facilitate an existing commerce through Affghanistan, if for no other reason than to open routes, and to encourage a class of carriers who have been, and may again be, of the utmost military importance to us.

X.

JESALMER; A REMINISCENCE.

"A fort has Delhi, Agra, too; a half one, Bikanír:
But best of all the Bháti built, the fort of Jesalmír."
Translation of old Local Legend.

IF the strong arm of the military executive had nearly done its work in striking down and crushing the directing and sustaining power of the Indian Mutiny before the close of 1858, there was a further serious duty to be fulfilled by the local government and the law, in preventing resuscitation of the scattered and disorganised elements of rebellion, as late as 1859. When Hercules destroyed the Hydra, his labours would have been incomplete had not a zealous assistant burnt, with a hot iron, the bleeding roots which supplied new heads to the dying monster; and as the avenging army of India may be fitly typified on this occasion by Hercules, so may the civil administration lay claim to have displayed the co-operative vigour of Iolas.

At the dawn of 1859 there was a great stir in the Bombay Presidency as to the movements of Tantia Topee, one of the last of the rebel chiefs who had won any special notoriety during the disturbed period of which we speak. Among other reports it was stated that he was endeavouring to escape his pursuers by crossing to the right bank of the Indus, and passing into the countries westward of that river. Now, a glance at the map will make it apparent that to reach the Indus from any part of India between Delhi and the Nerbudda, the fugitive or traveller would have to cross at least some part of the Thur or Indian desert.* One of the arrangements, therefore, to meet the occasion was, not unnaturally, an order to detach a squadron of Sind Horse from Jacobabad, that, crossing the river, it should move into the country eastward of the valley of the Indus, and closely watch the several lines of traffic, east and south, communicating with the more fertile districts of Rajputana, towards Central India. And as it happened that the camp of the Commissioner in Sind was at Amarkot, an important station bordering upon the Thur in the south-west, in February, 1859, it was judged advisable that one of the officers then in camp should proceed, in anticipation of the arrival of the squadron, and in furtherance of its objects and progress, to Jesalmer, a city which, from its beauty, old associations, and, to some extent, central position, might be justly considered the capital of the desert.

Notes of impressions derived at the time of these occurrences, however roughly recorded, will have a certain value, if only in calling attention to a most interesting, and too little explored city and *entourage*.

* For a detailed account of the Thur, see Sir Bartle Frere's exhaustive paper on the "Runn of Cutch and neighbouring Region" in the *Journal of the Royal Geographical Society*, vol. xl., 1870. The map there used in illustration will apply in the present case, with the addition of the roads from Amarkot to Jesalmer, and from Jesalmer to Rohri.

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The following extracts have at all events no pretension to take the place of a formally prepared narrative :—

"JESALMER,* 15*th February*, 1859.

"We reached this city last afternoon, much about the time that we left Amarkot on the Wednesday, thus making out our journey in exactly five days and nights. Annexed is a memorandum of the stages. . . . Thanks to the old Soda Thakúr, Hemraj, we managed exceedingly well at the several stations on the road. The freemasonry of opium appears to be the popular religion, and though my tastes were heretical, I found it politic to be orthodox.†

"After Gadra, a very few miles brought us into the Jodhpur limits. We had been joined by an additional *sowár*, and two Sodas, but the former only remained, as I considered his presence quite sufficient. Old Khanji and his attendant made a grand display at starting; but the years and lame mare of the one, and the liliputian beast of the other, took the respective cavaliers to a village off the road, after an hour's marching; and though the Sancho Panza made his re-appearance at Harsáni, our night's encampment, and reported his master's arrival, I begged he would not weary his aged limbs any more in my cause. Our party now consisted of my Munshi and servant, the Soda Thakur, two of the District Officer's *sowárs* and a peon, two Haidarabad *sowárs*, and two amateurs named Ramzan and Nihar—eleven in all, myself included.‡

"We traversed about 40 miles of country in Jodhpur, coming into the Jesalmer boundary at Rinda, where there is a Khosa picket, a recent measure which appears most appropriate and well-timed. I think some such plan might be adopted on the Sind-Bháwalpur frontier, to stop depredations in that quarter, at least within Jesalmer bounds.

"The people in Jodhpur were not uncivil. A soldier at Harsáni got everything we required, at an advanced hour of the night. He turned out all the small dealers to supply us, and I had the benefit of a cot in the vastest bed-room available, which, on this occasion, as on many others, was the open air, under the canopy of heaven. . . . .

"We halted at Jenkli, a village of Fakirs, in the Jodhpur limits, where I met with an old acquaintance, one Mulla Chárán. . . . . All Chárán villages are, I think, free grants in Jodhpur, and, generally, in Hindú states. The Rajah's officials interfere in no way with the interior economy of these land alienations. . . . . Mulla is an extempore poet, after the fashion of his tribe. On my mounting the camel to leave Jenkli, I observed the Jesalmer *sowár* on foot in front of me leading his beast. The reason was not evident; but, looking behind, I observed that all the party, except my servant, were doing the same. I asked Munshi Khudadád what was the matter. He replied that the town was one of Fakirs, and it was not the *(húkam)* order to ride in it. 'No, no!' cried out old Mulla; 'there's no *húkam* in the matter; it's only a custom.' Had I not gone so far, it is more than probable I would have forborne to break the rule. As it was, and having unconsciously mounted, there was perhaps no real occasion for me to alight; so on I went in at least unpremeditated transgression. But it was a seemingly ungrateful return for Mulla's attentions and especially good rice milk.

"The Jesalmer country shows very sparse cultivation. Occasionally a low patch, fed by recent rain, is found covered with stumps of the corn commonly known in India as *bajri*. I was informed that wheat is grown, but I have seen no nearer approach to it than this. The sandhills are not so numerous or heavy as I expected to find them. Rather should the country between Rinda and Jesalmer be described as plain, intersected at intervals with sandy and stony ridges. As we near the city, stone becomes more and more abundant; but in no place is the road difficult or impracticable for any distance. Perhaps the longest stretch of sand is in the undulating tract between Modah and Kotah.

"Wells and tanks are, as a rule, plentiful; but many are dried, or in process of absorption, owing to the want of rain the preceding year. The desolation of some of the villages is pitiable. House after house seems to have been either only half built, or abandoned on completion. Miles may be counted by tens before a human being comes within sight of the traveller. Yet the solidity of the structures, compared with the mud houses of Sind, and huts of the Thur and Jodhpur, is remarkable.

"The Chatris* and Lortis are, some, very graceful. The former have a pleasing and picturesque appearance among trees or green foliage of any kind. The effect of the yellow stone is considerably heightened by the fine carving and ornament. The wild trees and vegetation observed are *kirir* (caper), *babar* (acacia), *kandi* (thorn), *bēr* (jujube), *ak* (milk bush), and the grasses of the Sind Desert.

"On my arrival, I found a tent ready pitched, and a Munshi came out to usher me in; but I had written beforehand to Himmat Ram to hire a house, and thought it better to accept the alternative of the town residence, and so have all my people about me. There was no 'Istikbal,' or ceremony of reception on

* Jesalmer, said to have been founded by Jesal in A.D. 1156. Colonel Tod interprets *mér* to mean a rocky oasis, in the traditional nomenclature of the country.

† The march may be reckoned in round numbers at 150 miles. It comprises three political divisions of territory :—One on British ground, of 59 miles, in a direction east-north-east; one through the Jodhpur state, of 35 miles, somewhat east of north; and the third through the Jesalmer state, of 56 miles, almost due north. In the first of these, of the three villages meriting note, Bisoni and Itkan are off the road, and Gadra is the terminal point. In the second, the Mangwál village of Raneesir, the Bhatti villages of Mugrah and Harsáni, the Brahman village of Juriah, and Jenkli, of the Chárans, or bards of the desert, should all be recorded. In Jesalmer are the villages of Kotah, Kapuriah, Ramasir, Keeto, and Damrowa, of which Ramasir is Chárán, and Damrowa Brahman. For a regiment marching from Gadra to Jesalmer, seven stages * might be given where water and supplies could be made readily procurable. Soldiers should not, however, be allowed in the Chárán villages, and as little as possible in any others.

‡ Soda is the name of a tribe of Desert Rajputs, and the word "Thakur" is used among Rajputs much as "Sardar" is prefixed, or "Khán" affixed, to Muhammadan names, not always less questionably than "Esquire" in England. The reader will understand that "Bhatti," "Mangwal," and other probably unfamiliar tribal distinctions apply to local communities in Rajputana.

* Raneesir . .	14 miles	Keeto. . . .	9 miles
Harsani . .	10 ,,	Jesalmer. . .	15 ,,
Jenkli well. .	10 ,,		
Kotah . . .	17 ,,	Total. . .	91 ,,
Sectorai. . .	16 ,,		

* Sepulchral monuments eminent in Rajputana.

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the part of the ruling powers; for I do not believe they had the remotest notion who I was, or what was my business. . . . . After presentation of my letters of introduction, the messages and compliments became thick and liberal. The authorities had been yearning to see me for months and years; everybody and everything was to be at my disposal, and the Regent would come and pay me a visit at my quarters. He came early this morning, and I am now (3 P.M.) about to return the visit to the Maha Ráwal himself, having agreed to be fed for the occasion in the palace. I hope to continue this evening with a satisfactory account of my reception. . . . .

"8 P.M. The visit and dinner went off with considerable *éclat*. A forage-cap without the peak, a paletôt with the Medjidié, a sword, and the Regent's horse, magnificently caparisoned, gave me a certain amount of dignity which I had hardly anticipated, and we passed through the streets of the town up to the ramparts and citadel, amid a not unpleasant popular excitement. What much pleased me was the manner of the townspeople. There was no look of 'what are *you* doing here?' so commonly noticed at such times, especially among a Rajput population. Many groups made ready salams, and there was certainly something which breathed of welcome in the curiosity aroused at a stranger's visit. The portly figure of the Regent was soon visible at the entrance to the palace, and he ushered me, in a most friendly manner, into the royal presence. The Maha Ráwal is a beardless youth of fifteen, looking full nineteen years of age, tall, of stout build, and handsome in a peculiar style. My own opinion of him, from one interview, is that his intelligence is that of animal instinct, and that the *ingenuæ artes* would be too distasteful to him to admit their application. The question would be what to substitute in their stead to mollify his nature, and prevent the ingress of the brute passions. The countenance has much of haughtiness; there may be a tendency to sullen ferocity, if pride be curbed. The face is full and speaks in the eye. The manner is awkward and restless. The lips scarce utter a word. The outward action is that of an automaton, but is not boyish. I sat by his side, nearly touching his *gadi* (throne), but the coldness or shyness of his manner rendered my discoursing to him brief and far between. The Regent uncle sat at some distance off, and two Munshis in front of his highness. These two Munshis are the mild pillars of the Jesalmer state, one being the Minister of the Interior, in the sense of living with the reigning family in the fort; the other of the Exterior, having his dwelling in the town, and attending to the wants of strangers. The first is a Bhatti Rajput, the second I believe to be a Bhatti Bania. We had a long conversation, *i.e.*, the Regent, the Munshis, and I; and the presents were produced and admired with intensity. After the darbar the old gentleman took me to dinner, and the news-letter from Ajmer was read (while I dined) at my own request. After dinner we returned to the Maha Ráwal; *pan supari* (betel-nut) was produced, *atar* communicated from one to the other, and we separated on very good terms. I reached home on the regal palfrey just before dark. . . . .

"I can hardly describe to you my agreeable impressions of this city from a picturesque point of view. It is really a *bijou* of its kind. The elegance of some of the buildings, the beauty of the ornamental fronts, and the exceeding taste in the disposal of the premises, are remarkable. The archways on either side of the main street, and approaches to the citadel, would form a background for an Indian Thousand and One Nights. Government might well expend a few hundred pounds in photographing the more salient points of this unique pictorial display. Indifferently as I can attempt to render a landscape, it is impossible to resist the view at my window. . . . .

"*16th February*, 1859.

"This morning was taken up in an inspection of the Jain temples within the fort, and of the late Dewan Salem Chund's house in the town. The first are specimens of truly gorgeous yet graceful architecture. I never remember to have seen such carving. Many women were at prayers. The various lights and shades exhibited in our transit through the galleries were exquisite. Daylight partially admitted upon the carvings of five centuries ago, and lamp-light upon the myriad idols beneath, produced quite a dramatic effect. The Brahman temples I did not see, but they are not reported of in comparison with these.

"The Dewan's house is curious and handsome. The stone of the upper stories is very tastefully carved, and the higher part of the building forms a prominent feature in the general picture of the town.

"From the Jain temples, we proceeded to pay the Thakur *par excellence*, or Regent, a morning visit. He showed me all over his quarters in the citadel, and very snug and airy they are. Much as I wished to consult him on one or two matters, he looked too well-to-do and comfortable an old gentleman to get much out of in the way of severe diplomacy. We had a chat for a short time, during which was exhibited an umbrella, with gold fringe ornaments and handle, said to be 5000 years old! I was also favoured with an inspection of the portrait gallery of the Rajputana rulers. Udipúr bears a great family likeness to Jaipur, and Jodhpur to Jesalmer, and Jaipur to the Nawab of Tonk; and all are so like the figures on the wall of my lodging-house, one of whom does heroism from an elephant's back, and another smells roses in an impossible position, that I am tempted to believe all artistical creations in these parts are limited to one family.

"In the afternoon, the 'Minister of the Exterior' took me to a new tank, called the Gaj Rup Ságar, where the Thakur has been effecting great improvements, both ornamental and useful. A tunnel has been bored through the rock adjoining for a distance of about 500 yards; the sides have been built in with great labour, are faced with the Jesalmer stone, and cut with the usual precision. From thence, my cavalcade passed across country to the Bari Bagh. This is about 4 miles from the town, and is well worth a visit. I know not that it can be better described than as a long, low valley between limestone rocks, part of which is divided off by a stupendous stone-faced *band*, the top of which is broad enough and level enough for a chariot race, and the base of which is considerably broader. On the one side of this *band* is a very sensible and refreshing garden, full of mango and peepul trees, bērs, plantains, limes, oranges, and vegetables and flowers of all sorts. Fine stone-faced wells abound, so that water is for a time abundant, independently of the chances of rain.

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Higher up the valley is the village of Bari, whence the villagers bring vegetables for sale in the town. On the upper part of the rock on one side is the burial place of the Ráwals of Jesalmer, a little colony of 'Chatris,' the later of which show no signs of art decadence. That of the present Ráwal's mother, and his father, Gaj Singh, surpass in elegance the whole. I am afraid that I can better appreciate than describe beauties, whether animate or inanimate, or would attempt to render the lotus-like fall of the lady's Chatri shading her tomb. Two or three generations on, I came upon a handsome cenotaph, showing the carved figures of a Maha Ráwal and his three wives, all of whom had sacrificed themselves in the flames at his demise. The sculpture was sufficiently good to admit of moralising on the horrible superiority given to man, in thus making his death the signal of destruction to the females of his household; and the form of this chief looked fiendish even in cold marble.

"On my return to the town at nightfall, a letter for the Maha Ráwal was opened before me by the Munshi. It announced the departure of the Sind horse (200 men), on the 9th instant, *en route* to Rohri and Jesalmer. I much apprehend that the collection of supplies between Mithrao and Gotaro has not been effected, owing to the shortness of the notice given; but they assure me that orders were sent out on the subject, on the 13th. The wretchedly barren state of this country, scarcity of rain during the past year, and the absence of an organised *tappal* (post), make it imperative on any body of troops, marching suddenly towards Jesalmer, to provide themselves with three or four days' provisions on leaving Sind; and as much water as they can carry in leather bags or skins, taking advantage of every well on the road to replenish, and water the cattle. The authorities here are not wanting in will or energy to serve our Government, and their whole desire, in dealing with us as individuals, appears to be to give satisfaction. A Kardar started last night to facilitate the progress of the detachment.

"*17th February*, 1859.

"Some time ago there was a celebrated Seth of Jesalmer named Guman Chand, who had five sons. These five sons were named Bahadur Mull, Sowaia Rao, Mangana Ram, Zoráwar Mull, and Partab Chand. Bahadur Mull's son, Dán Mull (at Kotah), Sowaia's grandson Nat'han Lal, Mangana's son Babud Singh (at Ratlam), Zoráwar's son Chandu Mull (at Udipur), and grandsons Ganbir (at Udipur), and Jindan Mull (at Jodhpur), and Partab Chand's two sons Himmat Ram and Jeit Mull, appear now to be the heads of this firm. The two last named are here, occupying the family residence, and showed me over their quarters this morning. Their *haweli*, or set of houses, is entered by an archway which divides it off from the rest of the town, and tells a tale of opulence and luxury well worthy of attention.

"The rooms occupy four sides of a hollow or open square, and are built up to four and even five stories, inclusive of the ground-floor; staircases, and everything fixed and solid, of the Jesalmer stone. They are carved up to the very top of the house, sometimes simply, sometimes in the most fanciful and varied manner; never vulgarly. The stone, or indigenous work, is faultless. Set that aside, and the whole inner arrangement is semi-barbarian and absurd, *to our notions*. Rooms either wholly wanting in furniture, or choked with mirrors and pictures, chinaware and European nicknacks of the most paltry kind, show a wonderful perseverance in collecting rubbish and tinsel, but *voilà tout*. The portraits are of European ladies in short-waists, young Lakes or Cornwallises, a Princess Charlotte or two, and the different rajahs and chiefs of Indian reputation. The other pictorial subjects are taken chiefly from the Indian mythology, in which Krishna and Mahadeo seem the prominent figures; or, occasionally, are French, treated by French artists. One English theme has been so popular that it has been thrice represented by some native aspirant: it is Darby and Joan, smoking and drinking together, with the words 'Oh! the days when we were young.' This was an evident favourite of the owner of the house. There was a Rustam and the Deo Safid; also a king of Persia, which recalled to mind the Parsi shops at Karachi. My good and esteemed friend Pestamji has certainly one of these pictures.

"This afternoon we went out, accompanied by the 'Exterior,' to see more gardens, wells, and tanks. Our first great sight was the Mulla Ságar Well, with gardens and country seat of the Maha Ráwal. Distance about 6 miles in a south-west direction. The well is immense; about 70 feet in depth, the mouth about 40 feet square, and the descent by steps on all sides, the width gradually decreasing until the water is attained. This, and the adjoining residence, appears to have been the work of Mvolksy, the predecessor of Gaj Singh, father of Kaisar Singh. The whole is exceedingly tasteful and well laid out. Flowers and fruits were tolerably plentiful.

"From here we returned *viâ* the Amr Ságar Tank, faced with the usual solid masonry, and adorned by the villa and garden of the Maha Ráwal, a fine Jain temple, and the new villa and garden of Seth Himmat Ram. The last was well worthy of a visit. This wealthy gentleman is now building a residence, a private Jain temple, with solid vineries and garden fixtures, in a Rothschild style of outlay. A beautifully white marble chair, made in Jeypur and of Jeypur or Jodhpur marble, is one of the most striking objects. Fountains, paved walks, balconies, flowers, fruits, vegetables, here, there, and everywhere meet the eye. I confess to prefer Covent Garden; but still all this is very beautiful, and Himmat Ram undoubtedly cuts out the Maha Ráwal in magnificence.

"The number of stonemasons has been reduced considerably by British railway agents; and I was visited here by a stout Munshi, who appears to be doing his utmost to export the best workmen to Sind. Some 150 may have already gone. The carving is well and easily done, the stone being sufficiently hard to prevent chipping."

Five days afterwards, the Sind horsemen arrived. The writer had not left Jesalmer, and was able to accompany them, four marches eastward, to Pokrun in the Jodhpur state, where all were treated with great civility by the Thakur. This chief had been represented as a kind of recusant baron to his liege lord the Rajah; but was found, on acquaintance, to be a fine old Rajput country gentleman, living in a snug and strong fort and town, and possessor withal of a goodly stud and stables. The shaggy-coated ungroomed horses, kept purposely in a dark place, and in loose boxes, presented a characteristic feature of native training, and

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supplied a picture not easily forgotten. Pokrun offers an advantageous position for watching and guarding the approaches to the Indus, having open roads to Multan and Delhi on the north, Jodhpur east, Balmair south, and Sind west.

Hence the return journey was commenced on the 3rd March, Jesalmer being revisited *en route* to Rohri on the Indus. The passing stranger was again most hospitably entertained in this exceptionally handsome district capital. The courteous Regent again made a personal call; and as his guest was ailing, he sent him limes from his own garden, and frequent messages of kind enquiry; insisting on his further stay until the afternoon of a second day.

The distance from Jesalmer to Rohri* was reckoned at about 150 miles, over a sandy desert tract, not wanting in wild vegetation or material for firewood, or without occasional wells, but very desolate and wearisome to the traveller. There was no village worthy the name until within easy reach of the river, but there were mud forts at long intervals apart, and three shops at about 40 miles, two more at nearly 70, and a lesser store at about 100 miles. The character of the country was monotonous undulation: it was as it were a model of the ocean in sand; still, yet under an agitating influence, for the hollows were deep and the ridges high.

Fifteen years have passed since the period of the journey above noted; and there have been changes in Rajputana as elsewhere. The young Rána of those days died in June 1864. His successor, though recognized, was not fairly installed until late in the following year. A regency appears to have been the popular and natural form of government. It is much the same principle as prevails in Oriental states and provinces where a minister is the virtual ruler.

Visits of political agents to Jesalmer have been more frequent of late years. In the latest reports of the Rajputana States (1871-72), are the following passages:—

"We met the Maha Ráwal at his capital, 'a small but wealthy and handsome town.' He is a young man of quick temper, good disposition, amenable to reason, but uneducated and inexperienced. His highness promised the political agent to do his best to check his predatory subjects, but urged the disobedience of his Thákurs as well as his own poverty, consequent on famine and drought, as his reason for not being able to keep up a sufficient force to guard the frontier. . . . The town of Jesalmer is described as built of what appears to be sandy freestone, the dry air giving it a fresh appearance, and making it look unusually clean and new. The elaborate carving on some of the houses is not to be equalled in any of the Rajputana towns in purity and variety of design and beauty of material."

We may hope that a photographer will accompany the political agent on some future visit: for the place is really worth a little trouble and expense, quite independently of administrative or political considerations.

* The most interesting object on the way, was the site of Lodrova, the ancient capital, about 10 miles north-west of Jesalmer, and off the main track: now a town of some eighty houses, with twenty shops.

ON HUMAN AGENCY IN THE DISPERSION OF PLANTS.

IN the May (1873) number of *Ocean Highways*, we discussed the influence of icebergs, rivers, and currents in the dispersion of plants. In the hope of eliciting further information on the subject, let us now take stock how far another agent has been instrumental in accomplishing the same end. *Man*—the agent most recently and in fewest numbers at work—has, perhaps more than any other, helped to carry the plants of one region to another, and to confound the original distribution of species. Wherever he goes he carries the seeds of plants with him—the merchant in the packing of his goods, the colonist with his household gods, and, more directly, among his cultivated grains, and the march of his armies over the world might be traced by the plants which have sprung up in their tracks. The most carefully cleaned grain will contain the seeds of the weeds which have grown along with it, and which, like "ill weeds which spring apace," propagate rapidly until they gain a footing, and either maintain it, or, in many cases, maintain it to the prejudice of the indigenous flora. The seaman brings plants in his ballast from every distant land—the climate of which is often similar to that of the land on which he shoots it to make room for his merchandise, and accordingly every botanist knows, that there are numerous foreign plants to be looked for in any locality where ships are in the habit of discharging their ballast. Since the extensive introduction of foreign wools, in the vicinity of localities where this wool is washed and bleached many plants of the wool-growing countries have sprung up. De Candolle noticed this long ago in the vicinity of Montpellier, and mentioned that in his time there was scarcely a year in which foreign plants were not to be found naturalized in a wool-drying ground (Porte Juvenal) in the vicinity of that city. Among these naturalized plants are *Centaurea parviflora*, *Psoralea palæstina*, and *Hypericum crispum*. Since De Candolle's day various botanists have successively kept note of what plants sprung up, until now the list reaches the surprising number of 438—the species mostly belonging to the European coasts of the Mediterranean, whence most of the wool comes. However, representatives from Algiers, Morocco, Syria, Egypt, Asia Minor, North and South America, have presented themselves, including some new species, the native land of which is yet unknown. Near Louviers M. Bocquillon gathered out of Australian wool a great quantity of the fruits of Leguminosæ, which produced under his care numerous plants.* In every woollen factory, in the wool-cleaning rooms, heaps of the fruits of plants may be seen lying, and as in some cases these are sold to the farmers as manure, numerous foreign weeds may spring up in their fields. Planchon has, however, shown that though those seeds brought in wool to Montpellier give a varying character to the flora of the neighbourhood, yet only six species seem fairly naturalized and common. Mr. Gilbert Stuart† has more recently observed similar facts regarding the vicinity of Galashiels, where there are extensive wool washing and drying

* *La Vie des Plantes*, p. 269.
† *Trans. Bot. Soc., Edin.*, vol. x., p. 170.

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works. Among others, he found naturalized on the banks of the Tweed and the Gala the following species, some of which are rare even in England, some new to Scotland, while others are entire strangers to Britain:—*Camelina sativa, Lepidium ruderale, Saponaria officinalis, Silene anglica, Medicago maculata, M. denticulata, Lathyrum hypssopifolium, Polycarpon tetraphyllum, Daucus gummifer, Cacaulis ducoides, Erigeron acris, Centaurea solstitialis, Xanthium spinosum, Amaranthus Blitum, Chenopodium murale, Setaria viridis, Apera Spica-venta, Polypogon monspeliensis*, &c. Altogether more than forty species were found. Plants will escape from botanic gardens and get scattered all over Europe. In Linnæus's day the fleabane or Canada thistle *(Erigeron Canadensis)* had been seen scarcely a century in the *Jardin des Plantes* at Paris before it was carried by the winds over France, the British Islands, Italy, Sicily, Holland, and Germany.* The same observation might be made regarding various species of *Mimulus* especially *M. luteus*, which was introduced from North-West America, by David Douglas, not forty years ago, and is now scattered over the British Islands from Cornwall to the Orkneys, where I have picked it—to all appearance (had the contrary not been known) wild. Similar instances could be multiplied to almost any extent, but the bearing of the foregoing is self-evident. When we consider how recently the flora of Europe has been carefully studied, we may imagine how many plants crept in from other countries without being remarked, and are now ranked as indigenous species. The same intermixture is going on in countries the flora of which is imperfectly known. In hot and ill-cultivated countries such naturalizations take place more easily. For instance, Wildenow mentions *Chenopodium ambrosioides*, sown by Mr. Burchell on a point of St. Helena, multiplied in four years to such an extent as to become one of the commonest weeds in the island. The feather-like seeds of *Asclepias carasavica*, introduced from Otaheite into New Caledonia as the stuffing of a bolster, have now multiplied that plant to such an extent as to cause serious uneasiness to agriculturists. In the same island the common couch-grass, introduced a few years ago from Sydney, whence it came from Europe in the packing of some goods, has now sprung up in such abundance as to be rapidly killing the native grasses. The thorn-apple *(Datura Stramonium)*, a plant of the East Indies and Abyssinia, more than a century ago, had spread as a naturalized plant through every country in Europe, except Sweden, Lapland, and Norway, through the aid of gipsy quacks, who used the seed as anti-spasmodics or frequently applied them to more questionable uses. The same plant is widely spread over the United States. To such an extent has this gone on in certain countries, that in the Cape of Good Hope, for example, there are more naturalized introduced species than all the native ones put together. Finally, I am informed by Professor Archer, of Edinburgh, if further proof of the agency of man was necessary, that *Œnothera biennis*, originally introduced from America in ballast, is spreading all over Europe, forming a beautiful addition to the European flora.

In the United States it is a fineable offence to permit the Canada thistle to perfect its seeds. In Denmark the same law prevails in reference to the corn marigold and the common thistle. In the early history of Scotland whoever "poisoned the king's landes with weeds, introducing thereby a host of enemies," was denounced as a traitor. In Ireland, Canada (including British Columbia), and Australia, similar laws are in force in reference to the eradication of thistles. In St. Helena—at the time of its discovery in 1501—there were not found over sixty species of plants. Its flora now comprises 750 species, though allowance must be made for the more minute search of later times. These plants were introduced with seeds, &c. A collection of the weeds of Upper Egypt, and the gardens of the Bosphorus, were found to be identical with those growing under the same conditions in New England. The change from one locality to another is affected by a thousand circumstances. The herbs, which form so important a part of the *materia medica* of the Eastern States of America, spring up along the prairie path just opened by the caravan of the settler. The herbarium of the botanist may accidentally sow seeds at the foot of the Himalayas, or on the plains that skirt the Alps. The straw and grass employed in packing the sculptures of Thorwaldsen were scattered in the courtyard of the Museum at Copenhagen, where they were deposited, and next year there sprang up no less than twenty-five species of plants belonging to the Roman Campagna.

How armies help to scatter plants is shown by the fact that in the campaign of 1814 the Russian troops brought, in the stuffing of their saddles, seeds from the banks of the Dneiper and the Don to the valley of the Rhone, and even introduced the plants of the steppes into the environs of Paris. The Turkish army in their incursions into Europe brought Eastern vegetables in their train, and left the seeds of Oriental plants to bloom on the ramparts of Buda and Vienna. *Lepidium Draba*—a plant of Central and Southern Europe, and temperate Russian Asia—was introduced into England in 1809 by the returned troops from the disastrous Walcheren Expedition. Many of the troops disembarked at Ramsgate, and the straw of their mattresses was thrown into an old chalk-pit belonging to a Mr. Thompson, from whom the weed, now troublesome and spread over many parts of the Isle of Thanet, was long known to the country people as "Thompson's weed." In 1872 the attention of the French Academy of Sciences was called by M. de Vibraye to the fact that numerous plants, chiefly from Algeria, and other parts of the Mediterranean coast, which had been used for forage by cavalry and artillery horses, from beyond the sea, employed in the Franco-Germanic war, had sprung up on the fields of camp and other ground occupied by the armies. These plants, though from warmer countries, were getting rapidly naturalized, and flourished vigorously even in the most barren spots, transforming themselves into natural meadows. In the vicinity of Strasbourg, M. Buchinger found, on examining bundles of hay served out to some cavalry horses, in August 1870, eighty-four species of plants belonging to Algeria. On examining the meadows in the following spring two exotic *Centaureas* were discovered, and subsequent investigation showed that many more were continually springing up. Most imported species were found in the Department of the Loire and Cher, and along the right bank of the Loiret, the old racecourse of Blois, and other

* *Amœnitates Academicæ*, vol. ii., p. 409.

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places frequently occupied by troops. In March, 1872, young plants had sprung up near Blois and Orleans, on barren sands, where from time immemorial nothing had grown but a few stunted weeds. Altogether, up to the date of M. de Vibraye's communication, no less than 157 introduced species have sprung up, these including fifty-two *leguminosæ*, twenty-eight *graminaceæ*, twenty-eight *compositæ*, eight *cruciferæ*, eight *malvaceæ*, and a smaller number of representatives from various other orders. On the coast of Mekran the date-palm is common, but in the interior it is confined to certain lines of country, and the local tradition is that the palms along the lines in the interior of the country sprang up from the stones dropped by Alexander the Great's soldiers on their return from India.* In like manner the rib-grass *(Plantago)* used to be known among the New England Indians as the "Englishman's foot," and in Oregon, *Oxalis Acetosella* (the wood sorrel), which has now spread over all the cultivated districts, used to be known as the "Hudson's Bay weed," the commercial company of that name being credited (?) with its introduction in seed wheat. The nettle is also a constant accompaniment of man in his migrations from Europe over the world.

A mere accident will determine the introduction of a species. The Canada thistle is said to have sprung up in Europe from a seed dropped two hundred years ago from the stuffed skin of a bird. It is now one of the most common weeds.

It must, however, be remembered that man, if he assists in spreading species, also most materially assists in circumscribing the area of others—by changes in the physical geography of a country, or the introduction of species which retard the growth of either the indigenous or other colonial species introduced by him.†

The Struggle for Existence.—This phrase of Mr. Darwin's has got familiarised to an extent that few scientific terms have reached. We have long known that in the thickly populated human communities there is really a struggle for existence, but there is another struggle more ancient, dating from the first appearance of created beings on earth, and which has been raging ever since with a furor more or less keen than that with which unhappily (?) we of the newer creation have been too long acquainted. An appreciation of the nature and extent of this struggle lies at the bottom of a right understanding of the laws which regulate the range and development of species.

Duchartre—an eminent French botanist—has very piquantly remarked that the vegetable world presents the spectacle of a struggle going on at every place, and everywhere at the same time. No sooner does a plant take possession of a vacant spot than it is opposed by another invader; and in the case of social plants, the new arrivals take hold of the district to the ousting of all others—a flora poor in species thus occupying the place which might otherwise have been occupied by a rich one. In the struggle the most vigorous wins. Not only herbaceous, but woody plants, shrubs, and trees, are subjected to the competition for growing room and existence. We are, however, more familiar with it in the case of herbaceous plants. Linnæus calculated that if an annual plant produced two seeds, which shall arrive at perfection (and no plant produces so few), and these in turn perfect each two, and so on in geometrical ratio, at the end of twenty years the descendants from the original plant would be a million of individuals. It is reckoned that a single plant of groundsel *(Senecio)* may produce 6500 seeds, one of chickweed *(Stellaria)* 5000, and one of shepherd's purse *(Capsella)* 4500. Darwin* calculates that a single plant of an orchid—*Cephalanthera grandiflora*—produces 24,000 seeds, and the common *Orchis maculata* the prodigious amount of 186,300; so that, in ordinary geometrical increase (did not the "struggle for existence" intervene) the great grandchildren of a single plant would nearly (in the proportion of 47 to 50) "clothe with one uniform green carpet the entire surface of the land throughout the globe." Yet the orchid in question is by no means widely distributed—the result being that what with overcrowding, the preying of insects, and the mishaps usually looked upon as accidents, very few of this enormous progeny ever reaches maturity. The botanist who thinks over these matters, soon comes to the conclusion of Dean Herbert, that "plants do not grow where they like best, but where other plants will let them"—in other words, "climate and soil have not much influence on the free growth of a plant as the presence or absence of other plants, with which it has to struggle to maintain its place." Mr. Darwin† puts the whole subject admirably in the following passage, in reference to the animal kingdom; but the same, *mutatis mutandis*, might be applied to the vegetable:—"We behold the face of nature bright with gladness: we often see superabundance of food. We do not see, or we forget, that the birds which are idly singing around us mostly live on insects or seeds, and are thus constantly destroying life: or we forget how largely these songsters, or their eggs, or their nestlings, are destroyed by beasts of prey: we do not always bear in mind that, though food may now be superabundant, it is not so at all seasons of each recurring year.‡

In our own country this is apparent. The American water-weed *(Anacharis alsinastrum)* was first recorded in Britain in 1845, though observed a few years sooner. Now it has spread with inconceivable rapidity over the whole land (though, in Britain, it has never yet been known to produce seeds), to the extinction of the native water-weeds with which it comes into contact, yet in America it is not more troublesome than other weeds. The *Ranunculus aquatilis* (water crowfoot) generally disappears in due course when the *Anacharis* introduces itself. Its spread into so many localities is doubtless due to water-fowl. The fringed water-lilly *(Villarsia nymphæoides)*, Mr. Britten tells us, was

* Bartle Frere, *Proc. Roy. Geog. Soc.*, vol. xvi. (1872), p. 22.

† In the Appendix to Pickering's *Races of Man*, a list of the plants introduced into several countries is given.

* *Fertilization of Orchids*, pp. 344-45.

† His great work *(The Origin of Species)* is, of course, the best authority in regard to the questions here discussed. But in the Natural History Department of the *Field* for 1869, Mr. Britten, of the British Museum, has given an excellent *resumé* of the subject with new facts which we have taken advantage of. Dr. Maxwell Masters, with his wonted clearness and ability, has also discussed the subject in the *Popular Science Rev.*, 1873, p. 35.

‡ Pliny appreciated this struggle for existence:—"Necant invicem intersese umbra vel densitate atque alimente rapinâ . . . necat et edera vinciens, nec viscum prodest et cytisus necatur eo quod halimen vocant Græci.—*(Hist. Nat.*, lib. xv., cap. xxiv.)

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quickly eliminated from a pond on Wandsworth Common, Surrey, into which it had been introduced, when the *Anarcharis* made its appearance, though previously to all appearance naturalized. The *Potamogeton* seems, however, to be able to keep it in check. In some places this "water thyme," or "drain devil," is really impeding the navigation of canals and rivers—such as at Aylesbury and in the Cam. From M. Duchartre we learn that *Jussieæa grandiflora* thrown into the river Lez, close to Montpellier, from the Botanic Gardens, is now an impediment to the navigation, and that *Aponogetum distachyum*, planted in the same river, is also getting naturalized. In like manner, *Galsinoga parviflora*—a Peruvian plant—is getting naturalized in the neighbourhood of Kew and Richmond. *Veronica Bauxbaumii*, a native of Southern Europe and Central Asia, which first appeared in England in 1820, is now one of our most common corn weeds, and an American balsam *(Impatiens fulva)* is equally at home amongst us. We know that this has been introduced; but in reality plants like the poppies, corncockle, pimpernel, red dead nettle, fumitory, and most of our corn weeds, and even such plants as the chickweed, groundsel, shepherd's-purse, and *Poa annua* are to a great extent dependent on cultivation, and may have originally been introduced, though their origin cannot now be traced. The three last, as Dr. Hooker has well remarked, are closely connected with cultivation. "I do not remember," he says, "ever having seen any of these plants established where the soil was undisturbed, or where, if undisturbed, they had not been obviously brought by man or the lower animals: and yet I have gathered the shepherd's-purse in various parts of Europe, in Syria, in the Himalayas, in Australia, New Zealand and the Falkland Islands." The same eminent botanist and physical geographer directs attention to the fact that, while in uncultivated districts the proportion of annual plants is exceedingly small, in cultivated districts they are numerous; "and, the further we go from cultivation, roads and made ground, the rarer they become; till at last, in the uninhabited islets of the West Coast of Scotland, and in its mountainous glens, annuals are extremely rare, and confined to the immediate neighbourhood of cottages." He continues, "It is usually said of some of the annual plants that they prefer cultivated ground, nitrogenous soil, and so forth, and this is no doubt true; but that they will flourish where no such advantage attend them a very little observation shows; and that they do not continue to flourish elsewhere is due mainly to the fact that, being annuals, their room is taken as soon as they die, and the next year's seedling has no chance of success in the struggle with perennials." About one-fifth of the British plants are supposed to be naturalized species—many of them being dependent on agriculture for their existence. *Rumex acetosella* has been introduced in grain into nearly every colony, and in New Zealand it is spreading with singular activity, and would take possession of the land did not the farmer find that in the struggle for existence it cannot bear up against the greater vigour of the white clover, which soon kills it. This is taking advantage of "natural selection." Even, in one locality at least, the white clover has its match in the cat's-ear *(Hypochæris radicata)*, which has been introduced into New Zealand, where in less than three years excellent pastures have been destroyed by it. In little more than thirty years, at least 180 European weeds have got thoroughly naturalized in New Zealand, and in the Northern United States alone 214 British plants have got introduced from Europe since that country was colonized, and are now settled as if "to the manor born."* In Gray's *Manual of the Flora of the Northern United States* altogether 260 naturalized plants are enumerated, belonging to 162 genera, and of these 162 naturalized genera no less than 100 are not indigenous there. Out of 2091 indigenous flowering plants, there are 321 European species.†

The knot-grass is very common about New York, and the introduction of the *Anacharis* into Britain is paralleled by that of the *Vallisneria* into the Hudson, where, in the months of August and September, it almost stops navigation in many places. The watercress threatens to choke up the New Zealand rivers in the province of Canterbury. These may be taken as salient examples, but instances could be multiplied to almost any extent. Thus a grass *(Stipa textilis)* has invaded the Southern Russian steppes, and is rapidly displacing almost every other plant. Plants introduced into India since it was first visited by Europeans now range from Cape Comorin to the Himalayas, and several plants, such as the cardoon *(Silybrum marmiarum)*, and a tall thistle *(Cynara Cardunculus,)* introduced from Europe, now clothes, almost to the exclusion of other plants, whole leagues of the plains of La Plata and Uruguay. Auguste Saint Hilaire mentions that in Brazil, around Saint Therese, the European violets, borrage, fennel, and some geraniums, are perfectly naturalized. The oat is very common in the pastures, and everywhere throughout the country we find the familiar mallow *Anthemis* and *Marrubium* of Europe. A European *Magyrum* is now completely naturalized on the walls of Monte Video, and occupies the space between the city and suburb. The flora of the American prairies is, as a whole, singularly susceptible to the inroads of civilisation. Even the grazing of cattle for a few years is sufficient to materially alter its character. The grasses dwindle in size and luxuriance, while the relative abundance of the other plants become materially altered. The breaking-up and turning-up of the soil at once exterminates a large number of the previously dominant species, and the more hardy exotics usurp their places, the cereals, the cultivated grasses, and the noxious weeds of the old world thoroughly "crowding out" the original occupants of the soil.‡ Mr. H. Gillman notices that in a pool at Sandwich, on the Detroit River, U.S., *Wolfia Columbiana* (Karsten) has taken possession, driving out the equally tiny *Lemna minor*, before quite abundant.§

Mr. Darwin states that "the facts hitherto observed favour the supposition that in the struggle for life between the denizens of the Old Continent and the New, the former are prepotent," and attributes this to "the longer period they have engaged in the strife, and the consequent vigour they have acquired." At all events these facts show us that plants are not in all cases placed by nature just in those situations which

* Travers, cited by Hooker in *Natural History Review*, 1864, p. 124.

† Gray on Statistics of the Flora of the Northern United States, in *American Journal of Science* 1856, p. 9.

‡ J. A. Allen in *American Naturalist*, vol. iv. (1870), p. 585.

§ *Ibid*, iv., p. 690.

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are most advantageous to them—plants attaining more vigour in localities where they have not been settled more than a hundred years than in their original homes. In the clothing of a railway embankment with plants the annuals which at first take possession have soon to yield to the perennials, and disappear after a year or two.

In New Zealand especially do we see this struggle for existence going on between native and introduced plants and animals. The Maoris have even recognised it, and have a proverb that, "As the white man's rat has driven away the native rat, as the European fly drives away our own, and as the clover kills our fern, so will the Maoris disappear before the white man himself." Perhaps the most remarkable instance is the threatened extermination of the New Zealand *Phormium tenax*, a strong fibrous plant, with leaves sometimes ten feet long, by the common white clover. Though when masses of this "flax"—in reality it is one of the lillies, and does not belong to the flax order *(Linaceæ)* at all—are broken up, numbers of other plants appear on the disturbed soil, yet the white clover reigns triumphant over all. The cattle following the clover into the swamps, trample down the flax more and more, and so help its extinction, animal and vegetable thus working in harmony.

The original vegetation of the Cape Colony is being in many places destroyed or rapidly deteriorated by overstocking and by the accidental introduction of various weeds. Among the most important of the latter is *Xanthium spinosum*, introduced from Europe, the achenes (or characteristic fruits) of which cling to the wool with such tenacity that it is almost impossible to detach them, and which render it almost unsaleable. It spreads with such rapidity that in some parts legislative enactments have been passed for its extirpation; and where this is not done it almost usurps the place of the more useful vegetation. Mr. Bentham states that the *Xanthium* has in the same manner deteriorated the pastures in Queensland, whilst in the South of Europe, where it is equally abundant, it does not appear to cause such injurious results. Though generally distributed through Europe, the plant is, probably, of Chilian origin.*

And so it is in all countries, though more especially in those rich in species, and where the soil is more valuable, until we come to the Arctic Regions, where the species, like the natives, do not require to contend with other races, but only with the elements. In all this the student will observe that there is no confusion—no contradiction to the harmony of the Providence of Nature—but only parts of one beautiful law. The wars of the roses may be a perpetual war, but it is a war between well-ordered and well-disciplined foes. When we talk of a plant being "rare" or "common," we in reality condense into these two words a wider world of fact and theory than is dreamt of. In a remarkable passage Darwin shows this; and there is richer food for thought in it than even at first sight appears:—"When we look at the plants and bushes clothing an entangled bank," he writes, "we are apt to attribute their proportional numbers or kinds to what we call 'chance.' But how false a view is this! Everyone has heard that when an American forest is cut down, a very different vegetation springs up; but it has been observed that ancient Indian ruins, in the Southern United States, which must formerly have been cleared of trees, now display the same beautiful diversity and proportion of kinds as in the surrounding virgin forest. What a struggle between the several kinds of trees must here have gone over during long centuries, each annually scattering its seeds by the thousand: what war between insect and insect—between insects, snails, and other animals, with birds and beasts of prey—all striving to increase, and all feeding on each other, or on the trees, their seeds, and seedlings; or on other plants which first clothed the ground, and thus checked the growth of the trees! Throw up a handful of feathers, and all must fall to the ground, according to definite laws; but how simple is this problem where each shall fall, compared with that of the action and reaction of the innumerable plants and animals which have determined, in the course of centuries, the proportional numbers and kinds of trees now growing on the old Indian ruins." Yet the equilibrium of species in the world, or in the same particular locality, is preserved by the number of foes or allies it may have among the animals and plants inhabiting the same region—a question we cannot go into. It would be equally foreign to the nature of this journal to point out what bearing the facts we have enumerated have on certain deeply interesting and important philosophical questions now agitating the scientific world. It is enough to summarize the state of our knowledge, in the hope that our readers, scattered over the world, may add to it.

ROBERT BROWN.

* Shaw, *Journ. Linnean Soc.* (Botany), Vol. xiv., 202.

SIGN-POSTS ON OCEAN'S HIGHWAY.

DUST.

CHAPTER I.

(A Biography by one of the Family.)

"Who hath measured the waters in the hollow of his hand, and meted out the Heaven with a span, and comprehended the dust of the earth in a measure."

How few of those, who tread on us now, imagine that we had a beginning, that there was once a solitary Dust, with no one to think of him, no one for him to think of. Our present condition is so utterly antagonistic to solitude, we are so innumerable, so indestructible, so all pervading, that individuality seems improbable or even impossible. Our little ancestor is in fact a forgotten atom; we, his children, in our vanity and pride of numbers, have ignored what he has done for us; in our turn, we are not only despised and detested by all of our thinking relations, but we have been and are maliciously and systematically libelled by those who not only owe their existence to us, but who gain their living by our assistance. It is with a hope of stopping these long-existing scandals that we venture on this biography. If we are successful we will with pleasure condone with bygones, but at present we only refer to them as far as they are necessary to our tale.

To say that we are an influential family is a mild expression. We occupy every corner of the earth, we are in perpetual circulation, we obey the winds

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and the waters, we use both for our travelling equipages; we dive to the bottom of the sea, we fly to the utmost limits of the air, and the earth is full of our riches. All the forms that grow, all that live on the surface of the earth, are partly indebted to us for their positions and their conditions; all in the inanimate and animate worlds are constituents of ours, all have borrowed from us on personal bonds, with promise of repayment at uncertain dates. We recognize in their honesty a bright type of our common ancestor, a type that he has handed down to us from the beginning, a type entrusted to him by our Creator, a type that must continue to our end. Under the influence of this mutual confidence, a natural monopoly has spring up, our business has increased and multiplied, our premises occupy the earth's area, our strongholds are beneath the surface of soil and water, there we keep our accumulated capital, and interest ready for issue on demand. As the treasury of an empire contains types of all its coined issues, so we keep types of those that have issued from us; as coins have changed with emperors so our issues have changed with epochs. The care and accuracy with which we keep our treasures have very much aided man in preparing his endless index; he can still read coins that were struck 2500 years ago; but time and natural erosion have so obliterated some of ours, that horizons are irregular, and pages have become illegible. As science knows by the metal the æra of an illegible coin, so it is now reading some of our nearly obliterated monograms, with a hope of reading more. The catalogue has grown so long that we cannot stop to examine it critically; we shall use it as we require it, without lingering over the pleasant scenery by the way, as so many have done; but in examining our treasury we shall be guided by one great rule—the dust of yesterday is covered by the dust of to-day, by adhering to the context we hope to trace back the history of our great forefather. As coins circulate under the capricious and artificial laws of commerce, so we circulate under the fluctuating actions of the laws of nature. Every atom that we lend is converted into something else by the borrower, every loan repaid to us comes back in a character different to our issue. Some of our customers are very minute; as small coins circulate through many hands without much consideration, so our small constituents pass through many organisms; in every instance they are altered from what they were. Thus the invisible herb and the largest tree, the microscopical insect and the *Monstrum horrendum* have their separate and distinct uses for us dusts. We know that creatures and vegetations are innumerable, no two of them are alike in their mechanism, their chemistry, or appearance; types are for ever multiplying; as they do so, we benefit by the increase, and thus, as Professor Tyndall expressed it in his oration to the British Association at Belfast, "varieties are continually produced."

Under this still beginning, never-ending system, such great changes have taken place in the character and appearance of dusts, and our creations, that a growing confusion has crept into those histories or details of our family, which man, from the time of Solomon, has so often presented to his fellow creatures. Perhaps few of those who have done so have felt their own smallness so acutely as we do, yet we accept the same temptation as they did, and sit down with a hope of correcting some sign-posts, as well as of erecting another, which, with the aid of our delicate clue, may assist some future traveller to the long sought goal.

We have rested on the highways and byeways, on plains, on valleys, and on mountains—we have drank of the brooks, the rivers, the lakes, and the seas—we have dwelt in the mists, the dews, the rain, the hail, and the snow—we have known the calm, the breeze, the storm, and the hurricane—we have heard the thunder, and embraced the lightning—we have basked in sunshine, and shivered in the frost—we have been changed and broken up under the forces of all. Yet, as Tyndall expresses it, "however small the parts, each carries with it the polarity of the whole," every atom retains its use, and its principle We think that we have a clue to guide our trembling footsteps. We warn those who attempt to take it up, that it is weaker than a rope of sand, that it will not bear the grasp of a drowning swimmer, or sustain a stumbling runner; we ask the patient, in a spirit of affection, to take up the clue, and follow on.

The Bible, on which we love to rest because the chances of disturbance are so often few, tells us that our Creator occupied two days of His time in preparing the elements to make dry land; on His third day the dry land appeared; from that moment there was dust—a glittering finger-post on ocean's vast highway. From the present moment, back to the nursery of legendary lore, man has been puzzling his brains as to what came next. We have a good deal to say about the infancy of our ancestors but, to enable those who follow the clue to comprehend its meaning, it will be well to clear off a few cosmical mists which the caprice of man, for his varied purposes, has gathered around us. Perhaps there is nothing more wonderful in nature than the reasoning faculty of man. He may not have been created with it: it is even said of him at this present moment that he only varies from cattle by the lack of horns and tail; but he has, said the Lord God, "become as one of us to know good and evil." If we accept this dogma, we must also accept "Dust thou art and unto dust shalt thou return." In allowing that, we admit that the cosmical dust is the casket of our reason, and, as such, that it must be under the control of the Creator. Cosmogony and reason have been united so long and so intimately; the great religious doctrines of the world have been and are so closely connected with us for good and for evil, that we are not prepared to get rid at once of all the gods and demons denounced by Professor Tyndall in the oration referred to, as published in *The Hour* of the 20th of August 1874:—"Science," he said, "demands the radical extirpation of caprice"; on which we remark that true science has no caprice, but common sense demands the extirpation of caprice, when introduced to the world under the wings of science. Tyndall told his audience that the philosophies of Plato and Aristotle were "noised and celebrated in the schools amid the din and pomp of professors." Curiously he treated Darwin in the same way at Belfast, on the same cosmical subject. Ancient philosophers "felt that to construct the universe in idea, it was necessary to have some notion of its constituent parts"—those parts which the wise Lucretius called "the first beginnings." It does not appear that the science of the present has made more progress

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towards this point than was made by Euripides or Democritus; but it will appear by-and-bye that much progress has lately been made in building cosmical structures without any notion of first beginnings, literally without foundations. As long as the Professor alludes to such scientific structures, religion and common sense reject him—they do not understand his meaning when he says, "all religious theories, schemes, and systems, which embrace notions of cosmogony, or which otherwise reach into its domain, must, in so far as they do this, submit to the control of science, and relinquish all thought of controlling it." As long as the casket of reason is formed of cosmical dust, so long will cosmical science and religion be united: at present there may be caprice in both. Religion has not shown its caprice, Professor Tyndall has done so; he delights to honour Darwin in the national assembly of professors, in his search after "the origin of species." "With profound analytic and synthetic skill (Darwin) investigates the cell-making instinct of the bee-hive;" he "associated himself with pigeon-fanciers," and in reply to the question, "Can nature select"? he replied, "Assuredly she can"! The Professor tells his audience, amidst applause, that Mr. Darwin "shirks no difficulty," but not feeling sure that his own belief was sufficient evidence of Darwin's science, he brought in the glacial visionary, the late Professor Agassiz, amidst elegant oratory, as a witness to the point—"I confess that I was not prepared to see this theory received as it has been by the best intellect of the time; his success is greater than I thought possible." Professor Agassiz avoided expressing his own belief, and the words he used may have intended a very common proverb. Some years ago we rested pleasantly on Darwin's ideas: we were disappointed in them, as Tyndall seems to have been, for, said he, after gradually diminishing the number of progenitors, Darwin "comes at length to one primordial form." The Professor naturally asks "How came the form there"? His answer destroys the pedestal he had set up—"The anthropomorphism which it seemed the object of Darwin to set aside, is as firmly associated with the creation of a few forms as with the creation of a multitude." "Let us," he continues, "open our doors freely to the conception of creative acts, or, abandoning them, let us radically change our notions of matter." We will await a postulate before changing our notions. But Tyndall uses the word "grotesque" in reference to religion—past, present, and future. We shall see presently that what he calls grotesque was applicable to the condition of the times, while it is easy to reverse the sentence which he has uttered, and say the caprice of theories may be mischievous "if permitted to intrude on the region" of religion. In the midst of philosophic ideas Tyndall involuntarily returns to cosmical nature: "All we see around us, and all we feel within us—the phenomena of physical nature, as well as those of the human mind, have their unsearchable roots in a cosmical life" .... "inscrutable to the intellect of man." Into this his "science claims an unrestricted right of search." No one hinders him. Virgil, Dante, Milton, flew up to Paradise, and went down to Hell. The world has been instructed by their philosophic poesy, and the deeper science dives into the dust of cosmos, the more instructive, the more religious will it become; the more we search the more we find; for points, supposed to be concluded, are not even dreamed of in man's philosophy. Has not Professor Tyndall, in his ardour to reach the mountain peak, mistaken forms of religion for the thing itself—that great emotion of the human mind, that sees "a God in clouds, and hears Him in the wind;" and while finding fault with forms* for fettering his fancy, he glides down the snowy slope, and does not show how science is affected. May we express a regret for the omission, and commission? Concluding this subject, by quoting from a weekly paper, *Punch*, 29th of August 1874—

"But, even as Milton's Demons, problem tossed,
When they had set their Maker at defiance,
Still 'found no end, in wandering mazes lost,'
So is it with our modern men of science."

Looking back on parts of the outlines of ancient religious cosmogonies, we cannot help seeing that the systems were fabricated by man, to work on the emotions of his fellow-creatures. Grotesque though these systems may now appear, we cannot but allow that they were adapted to the times in which they originated, and that they are still suitable to those amongst whom they found a beginning. There was one supreme God, with his numerous avaters; there were demons in plenty for the followers of Brahma; there were perpetual destructions and reconstructions of worlds, good for the good, bad for the bad; there were oceans of sugar-juice, of spirits, of ghee, and of water, and the ambition of all was led up to a glittering circle of pure gold, encircling the earth as a tire encircles a wheel.

Buddah varied a little in his cosmogony: he had three worlds, three heavens, and three hells. The wants of life were satisfied by circles of land, of honey, and of water, while from the midst of these arose his mountain, "40,000 miles in height"—H. Miller. Are there not parallel passages in our own scriptures?—

"The hill of Sion is a fair place, and the joy of the whole earth." "He hath made the round world so sure, that it cannot be moved." "A land flowing with milk and honey." "The Earth is full of Thy riches."

Since these oriental days of good intentions we have seen a conclave of priests ignoring the Revelations of the Bible, punishing science, and rejecting the geographical wisdom of Columbus. Passing on to Hugh Miller, we find him saying in his "Testimony of the Rocks," that God did not reveal "the great truths, physical in their bearing," but left them to be developed "by the unassisted human faculties." We put down these unassisted among those who still carry the tails and horns, for every one who can think is assisted by his God.

When we come to separate cosmogony from religion, and to look upon it as a mere physical science, we shall see where present geological teachings lead us to, in reference to the point that we desire to elucidate. Mr. Henry Woodward, F.R.S., &c., has put together so many authorities, touching on our birthplace, that we take up his *Geological Magazine* to illustrate our introduction. In No. 114 we find—"Finite as is our individual existence we are privileged in forming part of a race .... which .... has achieved the power to grasp the most hidden secrets of nature; to investigate its laws, to decipher its monuments, and to evolve our planet's history

* Since this was written Professor Tyndall has explained that he only alluded to forms.

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from the chaos of the past." "These grand results have all been accomplished by finite means; each year our knowledge grows broader and higher, like some mighty atoll in the Pacific, not by vast accessions, but by the accumulated labours of individuals."

There are two points in this history connected with us dusts, which we must examine for the purpose of seeing if the secret of our birthplace has been correctly evolved; we must recollect that we claim it on the first dry land. Some of the present highlands of the earth may have been in that condition, and the question of their formation "has of late occupied many of our ablest and most profound physical geologists." It seems to be generally assumed, "that all the phenomena of corrugation of the earth's surface . . . are to be regarded as effects of one and the same cause, differing only in magnitude." The cause is in "a fluid interior;" so that "we are justified" in considering this earth "as cooling by radiation." Under this system rocks are supposed to contract, and "thus through the unequal contraction of the earth's crust," "the first preliminary stage necessary for the commencement of mountain formation would be accomplished."

After these minor corrugations were formed, "sedimentary deposits on the largest possible scale, resulting from meteoric action over the newly made continents, would begin to accumulate." We are not told what these sediments were formed of, but we shall come to meteoric action presently. Professor James Hall is quoted to show that some "mountain chains are composed of enormous masses, of sediment . . . even 40,000 feet in thickness." As the contracting cause had lost its power by its corrugating effort, and as only little wrinkles were formed, it was now necessary to show how these vast masses, accumulated as sediments under water, were "elevated." As the weight of these accumulations was also considerable, Mr. Woodward naturally asks, "Why does the yielding to horizontal pressure take place along these lines of deposit in preference to any other?" The answer is so ingenious, so philosophic, that we shall have to repeat it occasionally in our details. It had been shown by several illustrious geologists, that the accumulation of sediment "necessarily produces a rise of the geo-isotherms, and an invasion of the sediments by the interior heat of the earth;" but it will be recollected that just on this spot, this imaginary heat had already done its duty; the place had got cold, the rocks had contracted, they had formed wrinkles; 40,000 feet of sedimentary matter had settled upon them, and then the whole was lifted up by a new accession of heat from an unknown source. If science could apply this system to its boilers, they would steam round the world with one good heating. As soon as that cooled, a little hot water picked up at boiling stations would renew the boiler isotherms, and the service would go on merrily. We reserve serious notice of this comical theory till we reach our details; at present we can only remark that under the ordinary deposit of matter, not meteorites, there are soft deposits and hard deposits. When, under the current laws of nature, these deposits fall under the denuding forces, the hard deposits remain, while the soft are worn away, so that we cannot accept a birthplace for our forefather on the imaginary corrugations, or on the greater elevation produced by sedimentary deposits, when raised by the patent lift.

As to the profound physical geologists alluded to by Mr. Woodward, we are sorry to find that no two of them agree as to the manner of the formation of our birthplace, or as to the system in use by the forces employed on that formation; in fact, they cannot say where the one cause alluded to by Mr. Woodward is to be found. We shall show in the course of our Biography that this theory has for many years upset and distracted the minds of inquirers as to "the beginnings," and has induced many to raise great fabrics without foundations. At present we close this part of the subject by saying—

"No constant furnace burns in realms below,
No molten rocks in constant currents flow;
But we small dusts contain a heating cause,
By sunbeams lent us under nature's laws."

In raising his atoll Mr. Henry Woodward has alluded to meteoric action. We have said that our duty is to pass through all the creations of this earth; we said that all these creations repaid their debts, and we have just hinted how we dusts repay some of our debts to the sun; but Mr. Woodward introduces us to foreign matter. We must be careful how we meddle with it, how we allow it to mingle with our circulations now, or how far we may be indebted to meteoric action as giving our ancestor his birthplace. "When," says Woodward (*Geological Magazine* 114, p. 539), "the great continental areas were originally elevated as vast anticlinals above the general ocean," then "sedimentary deposits . . . . . resulting from meteoric action . . . would accumulate in the great submarine synclinals parallel to the coast." At the present moment these slopes parallel to coasts are the arenas where the last process takes place in triturating silicious rocks: they are rolled to and fro, they are battered against one another, the whole of their earthy matter is washed out of them, and carried on in solution, while the refined silicious sand forms the sea bottom of the slope, or is thrown up in glittering atoms on the shore. The earthy solutions are carried on and on, till the waters, finding a resting-place, leave them as sedimentary deposits on the flat, not the sloping, bottoms. The great sedimentary deposits of the ocean do not settle down on the submarine synclinals any more than the lees settle down on the sides of the wine cask.

Whatever meaning Mr. Woodward may apply to meteoric, no meteoric action could place the sediments where he wishes; but he touches on a subject which is highly interesting to us dusts, as leaving us to speculate on a higher birthplace than we thought of, and very materially increasing our circulation. As no precise meaning is given to it, we associate the word meteoric with—"No class of rocks offers such varied and marvellous attraction for the speculative and theoretical geologist as do those remarkable bodies called meteorites." There are few things, however simple in themselves, that cannot be converted into sensational subjects. We dusts ought to dance with excitement, when we are told that "many of these have come to us as entire asteroids from stellar space, through which, small as they are, they held their independent courses, and only succumbed (as our planet may, in its turn, be obliged some day to do) to the superior attraction of a larger orb than its own. "These meteorites" have been found in nearly every

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quarter of the earth's surface, "they are known to fall at all times, over land and over sea," so that "their actual number in each year must in reality be very considerable." The chemistry of these meteorites "teaches us that they yield only those elements which we know to exist on earth, and therefore we may justly conclude that the most distant regions in stellar space contain only a repetition, in varying proportions and combinations of the same elementary substances." Mr. Woodward congratulates his audience on the erection of this part of the atoll, and tells them that "this discovery of the continuity of matter throughout the universe may justly be looked upon as among the greatest results of intellectual effort, and one of the grandest generalisations of modern science." All this has been done by finite means; these are some of the secrets of nature, which man thinks he has grasped. The spheres, the worlds in stellar space, cast their fragments away; some of these atoms fall upon the earth; they renew the oriental teachings in an abstract way; worlds are destroyed and reconstructed; they are made simple cosmical phenomena now, while Brahma wisely used them for the religious and moral emotions of his time.

Utterly despised as we dusts are, we content ourselves with saying here that Mr. Woodward has no proof that the meteorites which fall on earth were ever part or portion of a sphere in stellar space; he cannot prove that any "atoms or systems into ruin hurled," ever scattered their fragments into stellar space; the poet may sing, "Now a bubble burst, and now a world," but science, as the filter of caprice, cannot do so. Mr. Woodward cannot prove that any meteorite, which has at any time fallen on this earth was, as a whole or in the shape of atoms, at any time beyond the atmosphere of this earth; so that there is no discovery of continuity of universal matter.

As far as we are concerned, nothing troubles us more than any alteration of our cosmical duties. Idle though some of us may be we are all bound to obey the laws. We are composed at present of all that was once beautiful and attractive, ugly, and unattractive; we have the poisons of growths, the odours of lives, the sweets, the acids, and the bitters; we contain all the colours of the rainbow; we are tough, tender, hard, brittle, and elastic, adhesive and non-adhesive; every quality found in any one of our types is partly due to us. We are amenable to the forces of air and water; we descend to the bottom of one, and ascend to the top of the other; our relations with these two elements are so admirable, so godlike, that man has not as yet comprehended them. As we mix with the air we give back to it the loans of the organisms that returned them for a time to our treasury. In consequence of these repayments the air retains its balance of power. When we have left our gaseous trusts behind us to mix again with the breath of heaven, to enter into more creations, we retire again to the earth; we retain our atomic polarity, as so beautifully illustrated by Professor Tyndall, on the occasion above referred to. Is it strange that, under the influence of this power, we should unite and concrete as our gases leave us, and then, as having done our duty, is it strange that we should return to the earth in showers of light and gladness? Is it wonderful that man's finite powers have not yet evolved this planetary system? He may glean some of its wondrous beauty by a system that he does know of. In descending to the bottom of the water we retain our gases, our minerals, metals, and our sunbeams; as we give them out again, the colours are used in growths and lives, our metals, minerals, and our gases are used for the same creative purposes, while man uses them to renovate feeble creations, and we remain there in the waters for the benefit of those that dwell therein. So long as this earth continues poised in air, and surrounded by water, this interchange of duties must take place. There are three incomprehensibles forming a unity, a wondrous world, a godlike Trinity, each dependent on the other, and in their innumerable actions they have not as yet been deciphered by man.

There is one more point connected with this supposed discovery that must not be here passed over. The chemical materials of meteorites are the same as the materials which are found on earth. As none of these materials which are found here could have existed as they are without earth, water, and air, it would be necessary for any sphere in stellar space, from which these meteorites came, to have the same trinity; but it is commonly asserted that the heavenly orbs have no atmosphere, and that they have varied densities. We rather think that similarity of systems must be proved before we can claim our origin from stellar space. If this similarity can be proved, there are fixed laws of attraction and gravitation, which, in our humble opinion, would be very antagonistic to any sensational arrivals on this earth from stellar space, and equally so to any departures from us to those regions.

In the course of our biography we shall have to touch on these points again; we cannot now rest on this mythical atoll as a birthplace for us. We foresee dark whirlwinds, and smothering dust storms, but we can follow the example of the wandering Bedouin, and while he repeats his prayers to the sand, we can whisper to our relations:—

"No chance ejection from another world,
No careless dusts on stellar space unfurled,
No new attraction for a falling star,
No finite thoughts our infinite to mar."

In other words, we cannot accept a birthplace for our great ancestor from stellar space, from igneous causes, or from any source independent of man's cosmical emotion to a Creator. We are bound up in the last, we are the cause of the second, and the first is not proved. Those, who try to throw dust in the eyes of others, may chance to have it returned; those who build fabrics without foundations, may chance to see them fall; and those who trust to finite thoughts, can never get beyond them.

The Dust of this earth is not as yet comprehended, its atmosphere is not understood, and its waters are not measured. We go on, trusting to our delicate clue, with a hope of measuring, understanding, and comprehending the birthplace and some of the results of the Birth of Dust. We will endeavour to build on sure foundations, never to be independent of a great "First Cause;" and as long as we are true to that, we cannot be opposed to science in its truth.

(To be continued.)

H. P. MALET.

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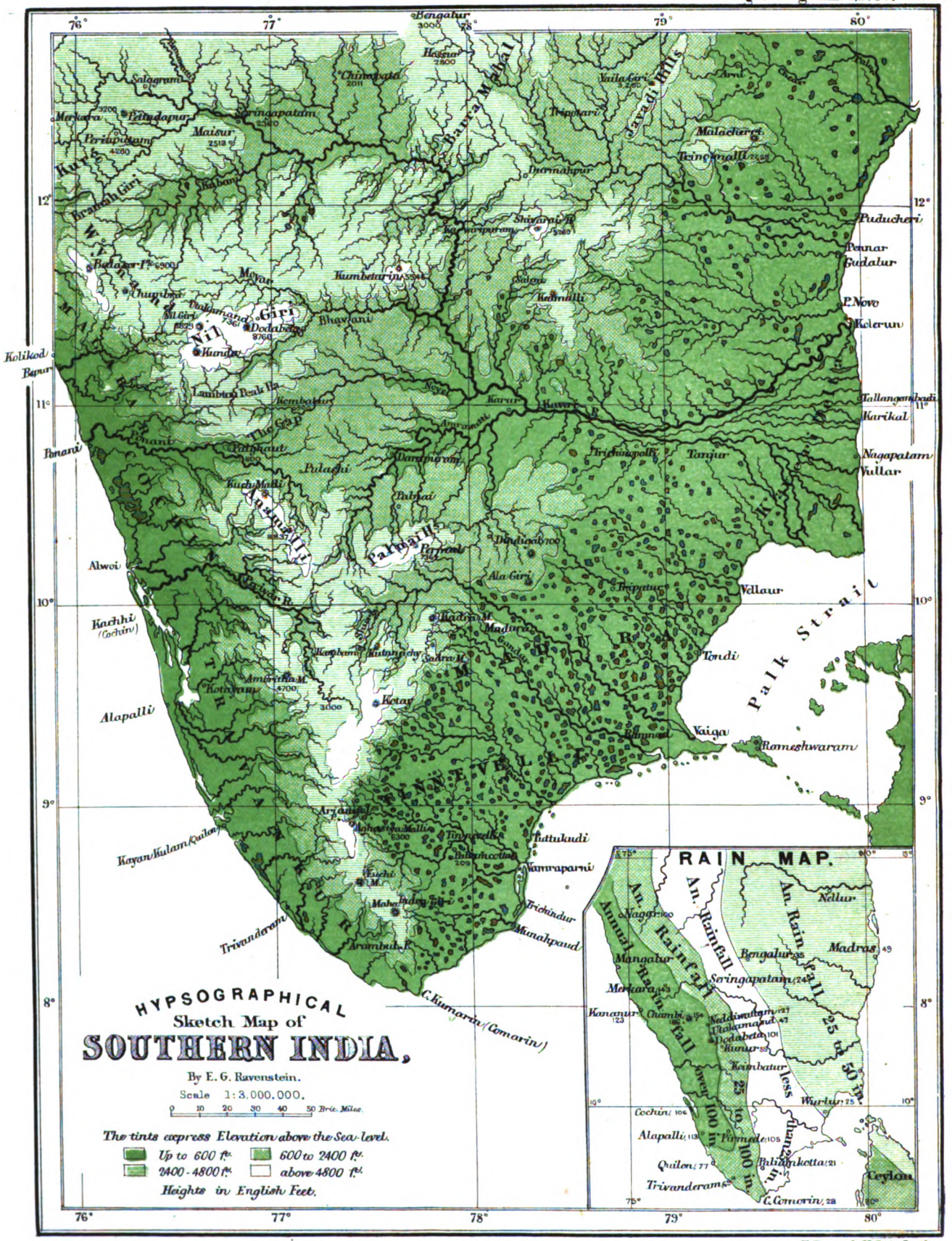

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IRRIGATION IN SOUTHERN INDIA.

THE PERIYÂR PROJECT.*

IRRIGATION is one of the most important questions which can occupy the attention of administrators in India. It is so, whether we consider the unsatisfactory state of repair of works of native origin in various parts of the country, their capabilities for improvement and extension, or the numerous great projects for providing water for hitherto unirrigated regions: whether we look upon it as a means of enriching and benefiting the inhabitants or as a source of increased revenue to the State.

The knowledge that the water, flowing through deep channels to the sea, would, if brought to the surface of the land, convert parched deserts into fertile gardens, has led to efforts being made to raise the life-sustaining element by various contrivances from the earliest times. Some districts trust to supplies from wells, others to tanks for catching and storing the water, wherever the formation of the land is suitable. Some extensive regions depend on the inundations of great rivers; while, especially in modern times, many vast areas are made fertile by the construction of dams at the gorges where rivers enter the plains, or where deltas commence. Through the delta systems in the Madras Presidency, with which the name of Sir Arthur Cotton is for ever associated, 1,352,360 acres of land are irrigated; and if the irrigation from tanks is added, the total area of irrigated land in the Madras Presidency is 3,124,480 acres.

But this is wretchedly insufficient for the wants of the people. Wide districts in Balari, in Madura, and other provinces, still vainly long for moisture; while enormous volumes of water roll uselessly to the sea; and, in some instances, flow through regions which are sufficiently supplied by the rainfall. It is the duty of the Government, aided by engineering science, to do all that human skill can achieve in the construction of works which will prevent this waste; and so convert tracts which are now arid wastes into cultivated fields and gardens.

The southern part of the peninsula of India is peculiarly circumstanced with respect to its water supply. This region is in the shape of a triangle, with its base formed by the rivers Ponani and Kaveri, and the Palghat gap, its apex at Cape Comorin, and its sides following the coast lines. It is divided into unequal parts by the mountain system which includes the Anamalli, Palani, and Travankur Hills, and terminates near Cape Comorin; and a glance at the accompanying hypsographical sketch map will show the positions of the native states of Travankur and Cochin on the west side of the mountains, and of the wider plains of Madura and Tinnevelli to the east. On the western coast, which receives the full force of the S.W. monsoon, the rainfall, as shown on the small rain map, is over 100 inches in the year; while on the eastern side of the peninsula it is only 25 to 50 inches. This difference necessarily produces a very remarkable difference between the two regions, which may be seen at one glance, from some commanding positions on the intervening hills. A spectator standing on the lofty peak of Aghastya-malli, where until recently there was an observatory, and facing Cape Comorin, will see, on his right hand, an expanse of country bounded by the sea, and covered with the richest vegetation; while on his left hand he will behold a parched and arid plain, dotted with tanks, sustaining patches of cultivation here and there. Yet, on this very east coast, a little further to the north, there is, in Tanjore, one of the richest and most fertile districts in India, formed entirely from the irrigation supplied by the Kaveri. This river derives its waters from the mountains of the western ghâts which receive the rains from the S.W. monsoon. To the south of the Kaveri it will be seen that there is no river with such distant sources, but that all the streams, in Madura and Tinnevelli, derive their scanty supplies of water from the dry faces of the hills overhanging the eastern plain. But a further examination of the map will show a great river, much smaller than the Kaveri it is true, but still of considerable size, which rises in the central part of the hill system and, after flowing for some distance in a mountain valley, finally turns to the west, away from the thirsty eastern plain, and falls into the Cochin backwater, where its waters are not wanted. This is the river Periyâr. The great problem, for the welfare of the people of Madura, to the east, is how to turn the waters of the Periyâr so that they may flow towards the Bay of Bengal, spreading blessings and fertility on their way, instead of into the Arabian Sea, where they are wasted. This is a project which is well worthy of more attention than it has hitherto received. Madura is a district covering 8789 square miles, being 75 miles long and 125 broad; and the population approaches 2,000,000, so that the importance of the undertaking is evident. The food of the great mass of the people is a very moderate amount of *ragi* porridge, with salt and *chatni*. Even this is precarious, and their very existence depends on the uncertain rainfall, while it is within the power of their rulers, by turning the waters of the Periyâr, to remove this uncertainty. At present the Madura district contains 5688 tanks (the larger ones may be seen dotted over the map), besides 508 river channels, 376 *anicuts* or dams, and 21,963 wells. Assuredly the people themselves have done all that was possible, with their limited means, to obtain water, and to prevent it from being wasted; but the supply is utterly insufficient, and the wells and tanks often dry up, especially on the sea coast, in the district of Râmnâd.

The water supply of Madura is mainly derived from three streams, and their scanty tributaries, which flow from the Varshanâd, Kambam, and Bôdi-Nâyakhanûr valleys, and unite near Allinagaram, to form the river Vaigai. These streams have their sources in the mountains overhanging the valleys, and immediately above them, so that their volume is little increased by the S.W. monsoon, and the Vaigai, as it flows by the city of Madura into the Râmnâd district, is never able to meet the wants of the people. The Kambam Valley is watered by the river Suruli, the main tributary of the Vaigai, the waters of which have been diverted for purposes of irrigation, from time immemorial. Its smaller tributaries rise on the eastern face of the mountains, one of them falling over a precipice, 800 feet high, and unite near Gûdalûr, at the southern end of the valley. Half a mile from their confluence there is the first *anicut*, or dam, across

* The orthography of the official Manual of Madura has been followed in this article, as most accurate. The spelling on the map, in some cases, is according to the orthography of the Indian Atlas sheets.

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the Suruli, whence a canal, on the left bank, irrigates rice lands for 5½ miles, and eventually falls into the Kambam tank. From its source to its confluence with the Vaigai the Suruli is 36 miles long, and altogether there are ten *anicuts* across it, with a system of canals and tanks, all within a space of 26 miles. The Kambam Valley, in its lower part, thus has a narrow strip of irrigated paddy land near either bank of the Suruli, while *ragi* and *tûr* crops are raised on the higher slopes, and herds of cattle find pasturage in the upper part of the valley.

Such is the system of irrigation on the principal feeder of the Vaigai. There are two masonry *anicuts* across that river itself, which are said to have been built by two dancing girls, favourites of one of the Naik kings of Madura. They are called *Perani* and *Chit-ani*, and are 22 and 18 miles above the city of Madura respectively. The channels connected with them are sadly in want of repair and reconstruction. Below the *Chit-ani* there is no dam across the river, the land having a considerable slope, and the channels being led off without the aid of an *anicut*. But the supply of water is insufficient, and in some recent years the river has been quite dry 24 miles below the city of Madura. Râmnâd looks in vain for water to irrigate its fields, and a vast region which might be one sheet of rice is now an arid waste. The whole of the above irrigation works are of native construction, and we have not even had the wisdom to keep them in ordinary repair.

Yet beyond the peaks and ridges that are visible from the plain of Madura there is the remedy for all this scarcity. It had, indeed, been observed by the natives of the country, for many generations, that while a scanty and insufficient supply of water came to them, a volume, which is out of all proportion to the possible wants of the western coast, runs to waste in the Cochin backwater. The people know that a great river flows within a few miles of the crest of those mural precipices whence the streams which form the Vaigai descend, but on the wrong side. The idea of cutting a canal so as to turn the waters of this river over into the eastern plain naturally suggested itself, and hence the Periyâr scheme is nearly a century old.

The great river alluded to is the Periyâr. The exact position of its source is unknown, for it rises in the unexplored mountainous region which is represented by the large blank on sheets 62 and 63 of the Indian Atlas. This blank probably consists of a mass of mountains, with peaks 6000 feet high, covered with dense primeval forests. It is about 30 miles long, by 20 broad. Where the Periyâr issues from the unknown country it is already a large river, and after a course of 8 miles in a N.W. direction, it is joined by two important streams called the Periyâr-Maliyâr and Yerl-yettu-Maliyâr (see *Map of the Upper Periyâr*). The latter is so called from the circumstance that the track crosses it *yerl* (seven) or *yettu* (eight) times. It rises in the mountains which bound the Kambam Valley on the south, and joins the Periyâr-Maliyâr, the united streams falling into the Periyâr. The Yerl-yettu-Maliyâr is joined by a rapid little stream, with a course of about 4½ miles, parallel to the mountain ridge, called Chinna-Maliyâr which means literally "small hill stream." It drains an area of about 18 square miles.

These details, which are all shown on the map, are necessary in order to make the scheme for fertilizing Madura intelligible. The country which will be the scene of future engineering operations is covered with dense forest, alternating with bamboo jungle and elephant-grass 12 feet high. At certain seasons it is excessively feverish, and abounds in wild elephants, leeches, and tigers. It is about 3000 feet above the sea, the crest of the mountains being 3200 feet and the Kambam Valley below, at its upper end, about 1500 feet above the sea. The village of Periakolam, at the lower end of the valley, is 1008 feet above the sea. After the union with the Periyâr-Maliyâr, the river Periyâr is 20 yards wide, and shapes a course among the hills, in a westerly direction, for 11 miles. It then turns north, and flows between hills covered with bamboo jungle, in a rocky bed, with a depth of 4 feet in the shallows. The discharge in December is about 80,000 cubic feet per hour, and the width of the stream varies, during the year, from 30 to 70 yards. Flowing onwards to the north for 90 miles, over a high rugged table-land, overgrown in places with an impenetrable forest, and receiving several tributaries, it finally passes Alwye, the famous bathing-place in old Portuguese and Dutch times, and empties itself into the Cochin backwater. Its whole course, exclusive of windings, is 150 miles. The lower portion is used for floating down timber, both by the Cochin and Travankur Sirkars; but when we consider that it receives hundreds of perennial streams, and several large rivers below the confluence of the Periyâr-Maliyâr, it cannot be asserted that its lower course would be injured for purposes of floating timber by the proposed dam. Meanwhile, so far as irrigation is concerned, the whole volume of the Periyâr waters now runs to waste.

The last served usually gets the smallest share, and the Zamindâri of Râmnâd forms no exception. This district is situated on the lower part of the course of the Vaigai, which does not enter it until it has supplied Madura with water. Hence Râmnâd has suffered loss and calamity for centuries, because the surplus water of the Vaigai does not reach more than half through the district, and frequently no surplus water reaches Râmnâd at all. The people of Râmnâd, therefore, have a special interest in the Periyâr project. Efforts of which we have no record had been made in earlier times; and in 1798 Mutu-Askula-Allay, the energetic Pradâni or Minister of Râmnâd, whose name is still remembered by the people, determined to renew them. For this purpose he sent some intelligent natives to examine the practicability of opening a channel, for turning the Periyâr into the Kambam Valley. They reported that the construction of a dam would secure an abundant supply of water to all the districts through which the Vaigai flows, and the project continued to be eagerly discussed, until two years afterwards the idea was taken up by the then Collector of Madura.*

* Mr. J. H. Nelson, the author of *The Madura Country*, a manual compiled by order of the Madras Government (Madras, 1868), throws doubt upon the above tradition of the Periyâr project having been taken up by a Râmnâd Pradâni. My authority is Ward's manuscript Survey Report, which, Mr. Nelson suggests, may be mistaken. He says—"I cannot help thinking that Mr. Markham accepted, a trifle too readily, an unsubstantial myth" (Part V., p. 55). At the same time Mr. Nelson tells us that the correspondence touching the cession of

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In June 1807, Mr. Parish, the Collector of Madura, undertook an expedition up the Kambam Valley, and over the mountains, to investigate the great irrigation scheme of which the natives talked so much, and the idea of which had been handed down from father to son. He was the first European who ever ventured into this wild region, and he nearly sacrificed his life in the undertaking, being attacked by jungle fever. He, however, requested the district engineer, Captain (afterwards Sir J. L.) Caldwell, to complete the investigation, and it was owing to the perverse report of this officer that the project was shelved for upwards of thirty years. His survey was so incomplete that it seems extraordinary how any opinion, either for or against, can have been founded on it. In 1808 he went up as far as the confluence of the Periyâr and Periyâr-Maliyâr, by following the course of the Yerl-yettu-Maliyâr, which he declared to be so abrupt, that "any attempt at the counteraction of nature's works by human efforts could only excite astonishment and ridicule in a mind possessing but a very ordinary share of judgment and discernment." Having come to this conclusion before he had taken a single observation, and upon simple inspection, he commenced a series of levels from the bed of the Periyâr; but before he had proceeded 400 yards he declared himself justified in condemning the project as "decidedly chimerical and unworthy of any regard. The country," he adds, "is in the heart of mountains remote from any habitation, infested with numerous wild beasts, and to an extreme degree insalubrious." It may be that the latter circumstances had something to do with Captain Caldwell's hasty condemnation of the scheme, on utterly insufficient data.

The unfortunate report of this officer had the effect of discouraging those who were anxious to see the great work accomplished. The project was cast on one side for many years; and, as the quaint writer of the manuscript survey memoir of 1816 says:—"Caldwell's report disconcerted the laudable intentions for benefiting the countries dependent on the Vaigai."

The Periyâr project was not heard of again until 1837, when Colonel Faber brought forward a plan in connection with some old works. This scheme, however, was on a very small scale, and was only intended to water the Kambam Valley. The work was actually commenced, and there are heaps of rubble and limestone still lying on the spot where it was intended to throw an *anicut* across the little Chinna-Maliyâr, and to make a cutting through the adjacent hill. The crest of the hill was also cut through for a depth of about 20 feet, and a channel was excavated about half a mile long and 40 feet wide. The works were abandoned owing to the breaking out of a fever.*

Colonel Ryves has the credit of being the first officer to revive the Periyâr project in its integrity, after the wet blanket that was thrown over it by Sir J. L. Caldwell. Colonel Ryves first penetrated into this wild country in 1861, when he lost his way in the dense jungle and long grass, and was nearly starved. In the following year he made a very careful examination of the locality between the 19th and 23rd of April, and came to the conclusion that the project was feasible, and that it would be very remunerative. At the point where the Periyâr-Maliyâr joins the Periyâr, Colonel Ryves found that the latter river flows in a deep bed through a narrow valley, between steep hills. Here he proposed to raise earthen bunds with wing walls on each side of the river, and to fill up the bed with a rough stone dam about 60 feet in height. Its effect would be to form an immense lake or reservoir, and at the same time to force back the Periyâr-Maliyâr and Yerl-yettu-Maliyâr, so as to oblige them to be natural channels for the new course of the water. The crest of the gorge separating the Kambam Valley from that of the Periyâr was found, by careful barometrical observations, both of Colonel Ryves and Mr. Barton, to be 190 feet above the bed of the river at the point where the dam is to be constructed, and the distance in a straight line from the dam to the nearest contour line level with it on the Kambam side is 4½ miles. The cutting would thus be about 140 feet in depth, and a quarter of a mile long, through solid rock. Colonel Ryves calculated the cost of the works at 6½ to 7 lakhs of rupees; but, on the other hand, the water will be worth 3 lakhs a year in direct revenue, besides the indirect returns resulting from the increased prosperity of the people. The quantity of water rendered available by the works will be 120,000 cubic yards per hour, from June to December, except for two or three weeks in October, 50,000 from January to March, and in April and May there will be a good flow from local streams.

In April 1865, Mr. Barton, the engineer to the Travankur Sirkar, visited the site of the proposed works, and pronounced them to be practicable. Mr. Levinge, then Collector of Madura, accompanied by Captain Payne, the executive engineer, visited the proposed site of the dam across the Periyâr in May 1864, but the whole party was attacked by fever. In July 1865, Captain Payne again penetrated to the Periyâr, where he found the leeches so abundant, and the grass of such extraordinary height, that surveying was almost impossible. But in 1866 he again, during some weeks, surveyed and measured the ground.

Captain Payne, in his report dated January 1867, stated that the height of the crest of the hills is 170 feet above the deepest part of the bed of the Periyâr. He recommended that the river should be entirely dammed up with a strong bund of stone and earth, about 150 feet in maximum height; the high flood-waters being turned over an escape weir. The waters of the lake, thus formed, would be diverted by a cutting of about 40 feet through the crest. The expense was estimated by Captain Payne at 150,000*l.* (15 lakhs); but it was considered that further investigation would be necessary before a final estimate could be framed. Captain Payne consequently prepared and submitted a final report on August 7th, 1867. The proposed works are a high earthen dam across the Periyâr Valley, and a cutting through the water-shed. The Periyâr waters will yield a supply sufficient for the growth of 149,000 acres of rice in addition to the amount already grown, in two crops. The final estimate is Rs.17,49,000, the yearly cost of maintenance Rs.50,000, and the net profit in the shape of increased land revenue Rs.5,00,000 a year, being 23¾ per cent. on the gross outlay. The plan was submitted to the Government, but it has not yet been matured.

Kâmbâm and Gûdalûr to the British Government seems to point to a previous utilization of the Periyâr waters by landholders of the Kâmbâm Valley.

* See *Reports of the Madras Engineers*, vol. i., p. 23.

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When the Periyâr project is commenced it will be necessary to render the immediate neighbourhood of the site less unhealthy, by destroying the bamboo jungle and long grass, making extensive clearings, and erecting comfortable lines for the coolies. The next step will be the completion of a good bullock track; and a Chinchona plantation ought to be established near the works, where the climate is suitable. In so notorious a fever district it will be difficult to procure coolie labour; but this obstacle will be removed by its becoming known that a few hundred trees yielding the fever-dispelling bark are planted within reach, and that supplies of the febrifuge will be abundant.

The Periyâr project will be a difficult and costly undertaking, but it is undoubtedly a most important work. By its means prosperity will be ensured to a large population, an extensive region will be fertilized, and the revenue will be sensibly increased. It will change the district of Madura into a second Tanjore, and convert the arid wastes of Râmnâd into a garden.

This is but one of many services which England owes to India. There are many more irrigation works which should be constructed, many irrigation systems which are suffering from insufficient funds for maintenance, but the Periyâr project is the oldest. It has now been discussed for nearly a century, and surely the time for maturing it, and for commencing work ought to be at hand. Now as the weary traveller descends from the crest of the mountains towards the Kambam Valley, he catches sight of an expanse of barren land scattered over with the *yerkum* bush *(Calotropis gigantea,)* which is dismal enough, and further on there are patches of *tûr* and *ragi*, and a few umbrella thorns round the circular huts of Gûdulûr. When that crest is cut through, and a future ruler of the land, like Lord Dalhousie on the memorable 8th of April 1854, has "let loose the waters with an easy hand," what a changed country will the traveller behold from his stand-point by the grand old *itti murum*, looking down the Kambam Valley. The patches of dry grain, the dreary milk bushes, and clusters of high-peaked huts, will be replaced by one sheet of brilliant green, with clumps of palm and fruit trees in frequent succession, concealing the new villages along the foot of the hills. Such physical changes by human agency must gladden the hearts of all geographers; and it is to be hoped that more years will not be allowed to pass before the good work is commenced.

C. R. M.

IMPRESSIONS OF JAMAICA.

CHAPTER V. — NATURAL PRODUCTIONS.

THE "crumpled sheet of paper," by which apt simile Columbus figured the island of Jamaica, was inscribed—so to stretch the metaphor—with a much less extensive roll of natural productions when he touched that land of enchantment than it now possesses. Luxuriantly clad with vegetation it was, no doubt, up to the top of its highest mountain, just as we see it from ship-board at the present day; and in all probability there is not one of its countless ferns or orchids but is indigenous. The very commonest weed in the north of the island is that poetical flower, the night-blowing cereus, which, in the prettily plaintive verse of Haynes Bailey, "sheds its perfume and opens its blossoms mid darkness and gloom." Youthful Caribs, ages and ages ago, may have stolen forth on starlight eves to seek those sequestered shades wherein the vestal flower wakes to its nocturnal vigils. Rocks and ravines are clothed with the same varieties of cactus that abounded on the island before its aboriginal inhabitants were disturbed in their possession. But the esculent fruits, the most valuable herbage, and even that grand staple of Jamaica's prosperity in the past and object of her despondent anxieties in the present, *i.e.* the sugar-cane, were brought to her as to a foster-mother. The wild Indian cane which was found on the island by the old discoverers merely gave them the practical hint that the soil was suited to the cultivation of a superior species. Palms of an unfruitful sort abounded; but the cocoa-nut tree was not. Coffee, I need hardly say, came from the east, and took kindly to the mountain soil and air of the Antilles. The numerous mango tribe also found a congenial home, having travelled from the opposite ends of the earth; but only one variety, the famed "No. 11," is fit for the dessert table, all the other kinds being, as I have before observed, turpentiny. Tamarinds, likewise, are an importation from the east. Oranges, lemons, limes, and all the citric-growths, hardly distinguishable by foliage though differing so widely in their fruit, were brought by the Spaniard. Such luxuriance is nowhere attained by the orange tree as in Jamaica. All the seasons, except winter, meet without parting on those boughs, which at one time are laden with bud, blossom and fruit in all stages of development, from the small green sphere, hard as a racket-ball, to the ripe, rich, full-grown golden globe. The pine-apple is, I believe, indigenous, and so, it is said, are the papaw, guava, sweet sop, sour sop, cashew-apple, custard-apple, star-apple, and naseberry. There is some difference among authorities as to the parental claim of Jamaica with regard to a few of these fruits; but I give them the benefit of the doubt, or it might seem as if I wished to deny all original merit to the Jamaican climate and soil. These are in truth marvellously prolific, and in many cases appear to be better adapted to the increase of imported plants than even their own native conditions could have been. The guinea-grass flourishes at least as vigorously and with as amazing a rapidity of growth wherever its seed falls in Jamaica as it does on African fields. Yet it was actually brought to the island for no other purpose than feeding the aviary of Chief Justice Ellis, who only found out by accident the importance of the herb for grazing. Before his birds had finished their supply of the new grass-seed a handful was carelessly scattered, and lo! a crop almost as magical as Jack's undying bean-stalk was the speedy result. It is a common thing to see a field of this grass in which cattle are feeding, and yet not to perceive that they are there at all. So nourishing is it that horses will work on that food alone, with but an occasional treat of corn. The plantain, as great a natural boon to the human animal as guinea-grass is to the brute, is included by Bryan Edwards in his enumeration of productions "spontaneously bestowed on the island by the bounty of nature." Whether indigenous or not, this inestimable food propagates wonderfully on all the lands, high or low, in Jamaica; and its qualities entitle it far more deservedly to the name of "bread-fruit" than do those of the

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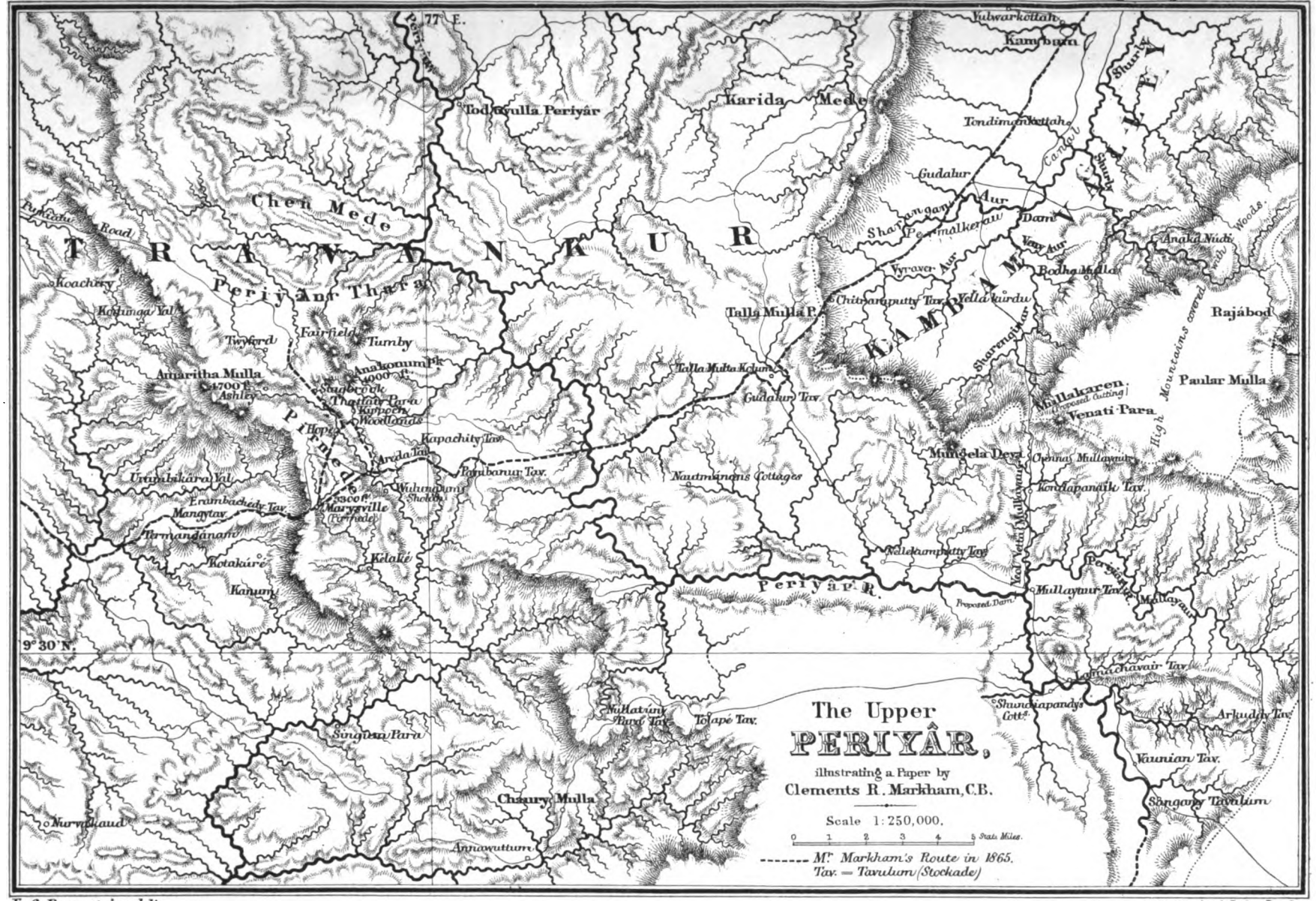

E. G. Ravenstein, delt.

T. Pettitt & Co. Litho, London.

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spongy, woolly, disappointing fruit which is generally so styled. I do not think I was ever more sadly *désillusionné* in all my life than when I first handled and essayed to eat what is called bread-fruit. In common with all strangers who behold it growing, I was very favourably struck by its appearance on the tree. An eminent naturalist, Mr. Gosse, describes it as "hanging by scores from the thick, many-jointed twigs;" and adds, "the enormous leaves, eighteen inches in length and breadth, elegantly cut into fingers, and of a beautiful green, well set off the large depending fruit, and seem to suit its colossal dimensions." This truthful picture recals vividly the first view of the prolific tree which only yields in luxuriant beauty to the mango. On the short single line of railway between Kingston and Spanish Town, which was the only iron road on the island a year or two ago, and which has since been extended to Old Harbour, a distance in all of 20 miles, I have many times passed a pen like an English park, thickly studded with trees that might well do ornamental duty for oaks and elms, but far denser and brighter of foliage. They were mango trees. The leaf is dark in hue, but very lustrous. So compact a mass of foliage is presented by no other tree that I know. It towers to a great height in the shape of a cone, and as the leaves are much liked by cattle, these animals in browsing keep the broad base as evenly cropped as by the shears of a Dutch yew-trimmer. On that same little railway-run, with the alligator-swamp and pestilent shore of the lagoon, as black as Styx, and covered with a rotting undergrowth, on one hand, and with the well-kept pens, backed by the Port Royal and Liguanea Mountains, on the other side, I have as often noted a cotton-tree of prodigious girth—one of the largest in the island. As cotton is cultivated, with more or less remunerative result, in Jamaica, it is necessary to observe that the cotton-plant which bears cotton, and the so-called cotton-tree which does not, have no relationship whatever. Of the shrub, enough is known, or may be learned, from any one of a score of readily accessible books. Indeed, there are specimens in the tropical department of the Crystal Palace, and elsewhere, which may be seen by any of us who will disburse a half-crown and take the trouble to look about us. But the general reader may be pardoned for doubting whether a full, minute, and authentic account of the cotton-tree, or silk cotton-tree, as it is sometimes called *(Eriodendron anfractuosum)*, exists in the English language. This is one of the giants of the vegetable kingdom. The trunk of such a specimen as I have now in my memory would measure not less than forty feet round. But vast as is the circumference of the Jamaica and Demeraran cotton-tree—a cousin-german of the *Bombax pentandrum* of equinoctial Asia and Africa—the magnitude of the trunk derives an addition, scarcely fallacious, from the immense spurs which radiate therefrom, and which, being of the same pale hoary grey as the tree itself, resemble stone buttresses, elongated, as they diminish in height into low walls. At their junction with the trunk, these sloping spurs are in some instances more than twice the height of a tall man. They maintain an almost uniform width throughout down to the point of their disappearance in the ground, and this width is rarely more than ten inches or a foot, which in fact would be the ordinary thickness of a boundary wall or stone fence. The resemblance to an artificial structure is greatly strengthened by the disposition to squareness and angularity, the top surface, as well as sides of the spur being often quite flat. The very irregularities in the outline and contour of these vegetable landmarks—for such they are, and I have now lying at my elbow a *Sailing Directory* for the northern part of the West Indies and the Mexican Sea, which instructs mariners sailing westward for Port Morant to observe as a mark one of these large cotton-trees near the Anvil Rock and Fort Pera—suggest an architectural method. They are just such deviations from uniformity as we perceive with admiration in Gothic art. And there is a peculiar justification in what may seem a fanciful comparison of the cotton-tree to a ruined tower. It is one of the few, the very few, tropical trees that are periodically denuded of their leaves; nay, it remains bare for a longer time than many trees of temperate or nearly frigid latitudes, whose branches are stripped by killing frosts and sharp boreal gales. For seven, eight, and even ten months, the boughs of the cotton-tree are completely defoliated. I have, for five months together, during which time the thermometer stood mostly above 80°, watched this leviathan of the forest, and to the last I have been unenlightened as to the character of its foliage. The limbs, each as big as an English elm, and bleached whiter than an ash, shoot forth horizontally, though with strange, weird contortions, to an immense distance, thus giving a singular contradiction to the theory broached by the amiable Autocrat of the Breakfast Table—a famous authority upon timber—that the reason why the oak has become the symbol of strength and endurance is that it alone does not shirk the work of resisting gravity, but defiantly chooses the horizontal direction for its limbs, causing their whole weight to tell, and then stretches them out 50 or 60 feet, so that the strain may be mighty enough to be worth enduring. Now, without yielding to any man in hearty respect for the opinions of Mr. Oliver Wendell Holmes, I venture to traverse that very pretty and plausible idea. It so happens that our *Eriodendron* or cotton-tree, though a giant, is at the same time a weakling. He has no heart like heart of oak. Outwardly he seemeth a pillar of strength, a brave and sturdy beacon, buttressed with the hewn rock. He has need of his buttresses, truly, for no structure is more frail or fallible than that imposing trunk. And yet it is this same tree, more fragile than the mulberry and so soft that the indolent negro prefers it of all manner of wood to work upon, that does indeed choose the horizontal position for its enormous limbs, stretching them forth vastly beyond that range of 50 or 60 feet which is modestly allowed by the delightful author of *Elsie Venner* and *The Guardian Angel* to his favourite oak.

Except for making canoes, by the primitive method of hollowing out the trunk or a branch thereof—a process which, in the case of any better class of timber, might be considered barbarously wasteful—the cotton-tree is well-nigh useless. Conspicuous by its gigantic proportions, and noteworthy for its picturesque grandeur, it is, in all other respects, insignificant. The fine filament that bursts in masses from the ripened pods, and resembles a hank of raw silk with its golden tint dulled to a pale bronze or lustreless brown, looks

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temptingly like a soft and generally superior description of cotton; and a stranger would be apt to say—"Ah! here is another sad example of neglected wealth in this idle, thriftless colony." If the reader has ever seen and handled that delicate object, a humming-bird's nest, he will have felt the exquisite softness of the silk-cotton tree's fibrous down. But let him pluck a tiny portion, and place it under a microscope, and he will soon perceive that the silky fluff has no quality of cohesion. These fibres, in the words of Mr. Gosse, have "neither the twisted form of true cotton, nor the jointed appearance of linen, nor the imbricated surface of wool." It might, indeed, be a rather poor substitute for eider-down in stuffing pillows or cushions; but these articles are not much required in a warm climate, and the compression of the flossy fibre for exportation would deprive it of the little elasticity it possesses. Having quoted Mr. Gosse, whose short stay at Bluefields, and whose scientific rambles in other parts of the island of Jamaica, were turned to excellent account in his volume published in 1851, I would refer all who may be interested in the subject of this curious tree, to that same book, in which will be found a full botanical description of the *Eriodendron anfractuosum*, furnished to the author by his friend and fellow labourer, Mr. Richard Hill, Member of the Council of the Royal Society of Agriculture of Jamaica. Mr. Hill tells us something very curious about the growth of this tree. He says that it is only in the early period of its life that it exhibits a growth by concentric layers; that it is observed soon to become ventricose at a short height in the trunk, being thicker about the middle than lower down towards the root; and that up to this time the bark is armed with strong spines, which are obliterated when the ventricose character disappears. "After this state of progression," says Mr. Hill, "it commences throwing out buttresses from the trunk to the long, radiated roots, which now show themselves on the surface of the soil. When the growth has advanced to this condition, the wood is no longer deposited in the lower part of the tree in concentric lines of regulated thickness, for the sap, both in ascending and descending, instead of being equally distributed under the bark, is now running in streams from the main branches, and forming those projecting spurs that obliterate the angles from the main roots; and the result is a ligneous deposition of greatest density where the streams strike off from the trunk. With this unequal deposit of wood is accomplished those flattened buttresses which become so remarkable a feature in this gigantic tree." Another and yet more wonderful property of the *Eriodendron*, or Ceiba, as it was called by the Indians, is the production of leaves and flowers in alternate years. "When seen with its seed-pods at the terminal twigs, dotting its immense mass of stems and branches all over, it has not yet expanded into leaf: the foliage is still enclosed in the leaf-bud. At this time it is much more an emblem of hope than Moore's almond-tree in Lalla Rookh; it not alone blossoms but matures fruit on a leafless stem." And again: "It frequently happens that one half of a silk-cotton tree, or some particular cluster of stems and branches, has an alternation of leaves and flowers in a different sequence of years from other parts of the tree. This deviation from what has been here laid down as the economy of the whole tree is very intelligible as a new condition of parts of the tree. It must have been seen that in the long run an *Eriodendron* or Ceiba, in distributing its sap in streams or lines from the main roots to the main stems, must change from an united to a divided economy of vegetation—that, instead of regulating its functions as one tree, it would set up an order as a bundle of trees clustering together in one column. Now it happens from some factitious circumstance, that one side of the tree or one set of branches have suffered some interruption, or have been forced into some acceleration of functions as great evaporating organs. This may have been a diminished growing property in the terminal twigs, or an increased nutritive power in a part of the roots; and nourishment may have been retarded, or oversupplied, in the portions of the tree which have gone out of equilibrium. Be it whichever it may of these causes, the alternation of foliage and flowers has been changed; and a half, or less or more than a half of a silk-cotton tree, may be seen in luxuriant summer foliage—a marvellous pile of verdure—and the other part bearing flowers and fruit on a leafless stem."

I have been tempted thus far into citing Mr. Hill's elaborate account of the cotton-tree, purely by the consideration that the peculiarities detailed by him have not engaged the attention of other naturalists. There is some excuse for such scientific *laches*. Mr. Hill himself says it requires a residence of five years in Jamaica, or observations during two successive alternations of flowers and foliage, and the commencement of a third, to gain a knowledge of this amazing tree.

Parasitic growths are, if not peculiar to Jamaica, at least characteristic of its vegetation in a remarkable degree. "The Creole in the hug of the Scotchman" is a jocular phrase often applied in describing a tree which has wasted or is wasting to decay under the close embrace of the wild fig or some other trailing and clinging plant. That word "Creole," by the bye, is very differently used in England and in the Antilles. Here, at home, a vague idea prevails that any human being termed a "Creole" must have a tinge of the negro blood in his veins; but this, so far from being correct, is the very reverse of correctness. I saw, not long ago, in one of our London police-reports, the description of a prisoner who was said to be "very dark-complexioned, and apparently a *Creole*." The word has nothing whatever to do with colour: there are Creole whites, and Creole negroes, and Creole half-castes, and Creole timber, and Creole beef and mutton. To have been *born on the island* constitutes anything's or anybody's being a Creole. The original word "Criollo," did indeed signify, to the exclusion of all other meanings, a white person born in the West Indies. You could not have applied the Spanish or the English term, in olden times, to any but a pure-bred white man or woman. In Jamaica and other English islands of the West Indies, the word "creole" came in time to include every native person, black, white, or brown, and every native production. Notably, we speak of Creole negroes and African negroes with a purpose of distinction, the former being descendants of the old slave stock, emancipated in the last generation, but still clinging to the soil, and the latter being immi-

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grants from the Gold Coast, many, indeed, having been rescued from piratical slavers, and having, when the choice was given them at St. Helena, of going back to Africa, or being carried on to Jamaica, elected to proceed "anywhere, anywhere," rather than return to the delights of existence under a sable monarchy. Thus, it will be seen that while the Jamaican use of the term "creole" is undoubtedly corrupt, it is corrupt by deliberate extension of its original meaning; whereas in England it is corrupt by perversion of that meaning entirely. To exemplify the common and frequent application of the word in Jamaica, I will just observe that the cheapest kind of wood used for flooring is "Creole mahogany," the Honduras kind being much better and higher in price; and that I was once presented with a case of what the kind donor assured me were "Creole pickles," as contra-distinguished from the imported abomination.

GODFREY TURNER.

SUGAR AND THE SUGAR-CANE.

MR. LOWE, in his financial statement on the 7th April, 1873, described sugar as "a sweetener which enters into all sorts of food—the delight of children and the solace of age." As many old ladies drink their cheering cups of tea *without* sugar, the latter part of Mr. Lowe's description can hardly be accepted as absolutely correct. There can be no doubt, however, that there is no article which is so generally consumed in some form or other as sugar, and it is only reasonable to suppose that a few remarks respecting its manufacture and the cultivation of the cane will be interesting to the most casual reader.

Many persons will doubtless be "surprised to learn" that in 1873 833,489 tons of sugar were imported into England. As the prices vary from 14*s.* to 31*s.* per cwt., 21*l.* per ton may be said roughly to represent the average value of each ton. On this basis the value of the trade, in 1873, reached the enormous total of 17,500,000*l.*

The following table shows from whence the bulk of this article was received in its unrefined state in that year, and its value:—

	£
British West Indies and Guiana	4,799,788
British India...	478,150
Mauritius	1,009,666
Spanish West Indies	4,038,346
Brazil	2,083,206
Java and Phillipine Islands	1,061,050
Other countries	3,750,327
Total...	£17,220,533

The above return must not, however, be regarded as representing the total amount exported from our principal possessions; as, for example, from Mauritius, in 1872-73, the total value of the export was 2,489,652*l.* More than half of the sugar made in that colony is taken up by the Australian colonies and India—for out of a total of 253,492,623 lbs. exported in the year named, 94,220,000 lbs. went to Australia, and 27,142,000 lbs. to India.

The finest qualities of Mauritius sugar are not imported into England, but as a rule find their way to Australia and Bombay.

The cultivation of the sugar-cane is peculiarly exposed in Mauritius to injury from hurricanes, as well as from insect plagues, two of which—the borer and the "poua pache blanche"—are particularly destructive. The former insect is furnished with a horn like a screw, by means of which it perforates the canes. It was estimated, in 1861, that the crop fell short by 20,000 tons of what it would otherwise have been owing to the destructive agency of this caterpillar.

Sugar-canes, when ripe, are about 12 feet high, and 2 inches in diameter. As soon as the plant blossoms the leaves begin to wither and die, and the cane changes its colour. The cane having ripened is cut, tied up in faggots and conveyed to the mill, where it is crushed by means of cylindrical rollers, the juice falling into large vats placed for its reception beneath.

In no part of the world has the manufacture of raw sugar been brought to a higher state of perfection than in Mauritius. Every improvement, alike in the process as in the necessary machinery which modern science has brought to light, has been eagerly taken advantage of, regardless of expense.

The *modus operandi* in the manufacture of sugar is now so generally known, that it is needless here to refer to it in detail; suffice it to say, that on almost every estate the vacuum-pan system, by which an immense saving in time is effected, is now adopted. When granulation has taken place, the time allowed for which varies according to the size of the crystals it is sought to produce, but may be said to be about four hours, the sugar is allowed to run out through wooden troughs into large iron tanks to cool, and afterwards passed through the "turbines" (centrifugal machines), which, revolving at the rate of 1000 rotations per minute, eliminates all the syrup from the sugar. During this process, water is added in more or less quantity, according to the degree of whiteness which it is desired to obtain.

For the last three years, to obtain a more perfect degree of whiteness in the crystallised descriptions of sugar, a system has been pretty generally adopted in Mauritius known as the "procedé Icery," so called from its owing its origin to the Hon. E. Icery, M.D. It consists in the use of monosulphite of lime for the better purification of the vesou (cane juice). The "clairce" after leaving the battery being treated by this process previous to passing into the vacuum pan. The syrup as it issues from the turbine is collected in reservoirs, to be again brought back to the vacuum pan, producing sugars known as first, second, or third syrups. The residue or molasses is finally appropriated to distilling purposes.

Since the introduction of steam-mills and machinery the cultivation of the sugar-cane has nearly superseded all other kinds of agriculture in some of our possessions. In Trinidad and one or two other of the West India Islands great central factories or usines have been erected either by companies or by the local governments. To these factories the different estates in the islands send their canes, and some of them are capable of manufacturing from forty to fifty hogsheads of sugar per diem.

Reference has been made to the annual exports of sugar from Mauritius to Australia. It may not be generally known that a formidable competitor for this trade has lately arisen in the colony of Queensland, and that, besides providing for its own consumption, it has already commenced the shipping of sugar to the neighbouring Australian colonies.

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Sugar-growing is already included amongst the prominent industries of Queensland, and the sugar commands a good price.

The rich scrub and forest lands on the banks of the rivers along the coast, from the southern boundary to lat. 18°, are admirably suited for the cultivation of the cane. A refinery has been established, and several mills are being erected. In 1865 there were only 450 acres of sugar crop, against some 10,000 in 1872.

Sugar being an agricultural product which has started into existence in this young colony within the last few years, and a large and increasing area of country being taken up for its growth, the industry will certainly soon assume very large proportions. The growth of the cane is one of the best paying agricultural pursuits of the colony.

The general prospects of sugar cultivation and manufactures are clearly in the ascendant, and it would be presumptuous to attempt to fix any limit to the probable extension of this already enormous and profitable trade. In the year 1700 the quantity of sugar imported into this country was about 10,000 tons, whereas, in 1873, it was 833,489 tons. Sugar, therefore, is not only one of our principal articles of importation, but one of the most indispensable necessaries of life.

W. ROBINSON, F.R.G.S.

THE HIGHWAYS AND BYEWAYS OF NAVAL HISTORY.

IV.

CAPTAIN GEORGE ST. LO AND HIS TIMES.

AMONG the many quaint and amusing characters with whom the searcher through early naval books and documents is sure to make acquaintance, I have not met one better worth a few moments' attention than he whose name heads this article. The man was a Captain, and afterwards a Commissioner of the Navy, and the time in which he flourished was the last decade of the 17th century, and the first of the 18th. In his character I trace that odd mixture of shrewdness and simplicity which seem to me to have been typical of the era in which he lived, and which was so very conspicuous in his former brother Commissioner, Samuel Pepys. But, however amusing the examination of such a character may prove, its real value will be found when it is combined with contemporary circumstances; we then get a glimpse at that controverted point, how far the man makes the condition, or how far the condition makes the man?

The Revolution of 1688 appears to have seriously affected the welfare of the navy. The order and discipline brought about by Charles I. naturally fell to pieces when his Lord High Admiral, the Earl of Northumberland, sided with the Parliament in 1642. It was then a question of hours whether the Royal or the Parliamentary Admiral got command of the fleet, and it followed, naturally, that the sense of duty and obedience which had always characterised the seamen, was strangely perverted, and disarranged by the setting up of such rival claimants. Blake and his colleagues fully restored the balance by leading the sea forces to the conviction that they served their country, and were outside and above its political troubles. But the fleet became again a political engine—though unused—when James fell; and in losing a king, who even on the throne managed the details of the service, the navy lost a head for whose place no efficient substitute was for some time found. William was a soldier, and the Dutch, who as enemies had taught us so much, no longer acted in that capacity. The consolidation of the New Government at home, and the subjugation of Ireland, occupied the attention of the best men in the State, so that however vigorous the naval administration of the day may be considered, its vigour was misdirected if we are to judge by the results. It was a time of great peculation, discontent, and mismanagement; and in consequence a time of many miscarriages at sea.

Mr. St. Lo was employed in command of a ship in protecting our East Coast Fisheries in 1685, before the war with France broke out, and one of his quaint ideas he there had the power of carrying out. His duty was to prevent the Dutch, who sent some 3000 fishing vessels, and the French, who sent about 100, from fishing within sight of our coast. The French—"finding the sweetness," as our gallant captain expresses it, "would be pressing in for the shore," for which reason "he sometimes took several of their masters on board him, and then set sail to the open sea, and there put them all on board one of their vessels, to show them sea-breeding, and, they having no boats, were two or three days before they could get into their own vessels again; and this," he says, "I did purposely, that they, of all others, might not have the encouragement of overrunning us in our Fishery."

The war which broke out with France after the Revolution, proved to St. Lo the destruction of his immediate hopes; but by one and the same incident, the foundation of his fortunes. He commanded the 'Portsmouth,' a fourth-rate, carrying some 200 men, and, in 1689, she had the misfortune to fall into the clutches of a 60-gun Frenchman, the 'Marquis,' commanded by Chevalier Demany. The little 'Portsmouth' fought a gallant fight, St. Lo being badly wounded, and the ship so disabled that she could not be brought into port. But the odds were too great, and St. Lo, with his ship's company, was carried to Brest. He was a sort of man who shut his eyes to nothing, and as the hospital to which he was conveyed overlooked the dockyard, he kept them particularly wide open, and noted, to his great surprise, that they did the thing much better in France. "I was astonished," he says, "at the expedition used in manning and fitting out their ships, which, till then, I thought could be done nowhere sooner than in England, where we have ten times the shipping, and, consequently, ten times more seamen than they have in France; but there I saw twenty sail of ships, of about sixty guns apiece, got ready in twenty days' time; they were brought in" (after their return from landing troops at Kinsale and Cork), "and the men discharged; and, upon an order from Paris, they were careened, keeled up, rigged, victualled, manned, and out again in the said time with the greatest ease imaginable. I likewise," he says, "saw a ship of 100 guns there; had all her guns taken out in four or five hours' time, which I never saw done in England in twenty-four hours—and this with greater ease and less

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hazard than here, which I saw under the hospital window."

The ships being so soon got out to sea after being dismantled and paid off, set St. Lo thinking as to how the men were obtained; and thought set him upon enquiry, for he knew that under the English system the re-manning of such a fleet in the time was a sheer impossibility. He then lighted on the precursor of the present *Inscription Maritime*. The system had been established by Louis about the year 1675, and seemingly answered extremely well.

In both the material and the personal arrangements of their navy, St. Lo thus discovered that the French had an advantage; and the conviction determined him to bring the matter under the notice of his own government on his release from prison. He did so in a year or two later, and in 1693 published the substances of his new ideas in a small book entitled *England's Safety; or, a Bridle to the French King*, a work which helped to make him a Commissioner of the Navy, to give him the command of the new yard at Plymouth Dock, and to christen him with the nickname—which he bitterly resented—of "The Navy Board's Darling." Thus the loss of his ship, and his wounds, together with the seemingly unimportant fact that the window of his sick prison overlooked a French dockyard, became for him the bases of his prosperity.

When the navy breaks out in pamphlets we may generally assume that something is very wrong, for the seaman is not a penman as a rule, and it is commonly hard to drive him to foolscap. In St. Lo's time there was a good deal of naval pamphleteering going on, and the publications teemed with the loudest complaints, and the direst forebodings as to the material and moral condition of their Majesty's naval service.

"Great Britain's Groans:" writes Mr. W. Hodges in his title, "or an account of the oppression, ruin, and destruction of the loyal seamen of England, in the total loss of their pay, health, and lives, and dreadful ruin of their families." In another pamphlet he gives "A Dialogue concerning the art of Ticket Buying. In a discourse between honesty, poverty, cruelty, and villainy, concerning that mystery of iniquity, and ruin of the loyal seamen (1695)." Then comes (1699) "Ruin to Ruin, after Misery to Misery. Being the distressed and ruined, and perishing state of the loyal and faithful seamen of England." We have also (1691) a great series of complaints from "Mr. Henry Maydman of Portsmouth, aged fifty-two," who gives us a long-winded story—sometimes not very clear—in "A modest and brief discourse of the Royal Navy of England." Mr. Maydman cuts at the captains, especially at the "Gentleman Captains," and thereupon Mr. St. Lo has something to say on the other side. "It may be objected," he remarks "(perhaps from a book lately set out by one Henry Maydman, a purser), that seamen are discouraged from their Majesty's service by the abuses of their commanders: to which it is answered; it is a sign that *that* purser hath sailed with honest captains that would not let him pinch the men; for the men never fare better than when a captain and purser disagree. I observe he carefully conceals his employ of purser, well knowing that of all officers such a one in this case is the least to be credited; for let commanders see that the pursers do not wrong the men, and let them be paid their Majesty's allowance, and the tickets at payment of the ships, or upon tender afterwards, they are very well encouraged and care not for hard words from a captain, which break no bones." By this we see that St. Lo was not at all inclined to let a comparative outsider fling at his cloth with impunity, though he did not on other occasions hesitate about doing the same thing himself.

A small pamphlet "humbly offered to the Honourable House of Commons by an English sailor," in 1699, attacks the victualling, and says, "Had the mismanagements of the navy tended only to the consumption of our wealth, the loss might have been repaired; but when our sailors are poisoned by bad provisions, or starved for want of good, the loss is irreparable. Thus, the blood of war is profusely spilt in louzy hammocks, stagnated with noisome scents, and the flower of our youthful sailors smothered in unsuccessful and needless voyages, who might have won to themselves and the nation immortal wreaths of honour in noble attempts against the enemy." As a specimen of confused idea and of confounded simile, the passage might take rank with some which Macaulay has held up to everlasting derision; but "A Well-wisher to the Royal Navy of England," in 1700, found a much more satisfactory point in his opponent's armour. "By what means," says this indignant gentleman, has the pamphleteer "rendered himself so great a proficient in maritime affairs since the time he inspected the quartering of beasts? (*Clerk in the Cutting House at 40l. per annum*," says a marginal note with cruel insinuation), "and how can he, with as much ignorance as confidence, pretend to judge of the actions of those gentlemen who have been employed in the Admiralty, but also of what lamentable effects will attend the administration of the present commission, with the person" (Mr. Burchet) "who now has the honour to serve as secretary thereunto? What satisfaction he can give in these particulars I cannot forsee; and, therefore, shall conclude that he has, over a *pot* and a *gill*, took them on trust; and that being inspired with the potent liquor, he has dished them out so as to agree with his own squeamish stomach."

Other passages of the former pamphlet deal less with simile, and are more direct and more vicious.—"The sailors' case is indeed deplorable; kept long without pay, sometimes six years; forced to sell tickets to raise a little money for their families at half value, though as good and brave Englishmen as any, are altogether enslaved, and without any law that I ever heard of impressed; their liberty taken from them, which, when gone, they are effectual slaves, imprisoned on board ship, caned and kicked by commanders, just dropped from behind a coach at Whitehall into the service of the navy; miserably abused in being turned over from one ship to another (contrary to the rules of humanity and the custom of the navy), so that after they have been at sea several years are hurried out again without liberty so much as to see their relations. Now, all things considered, what encouragement have mariners to serve their country in the navy? The only thing they have a seeming certainty of is their meat and drink, and to be cheated of that, too, is the devil." In another place he says, speaking of the West India Station, "A hot country, stinking meat and maggotty bread, with the noisome

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and poisonous scent of bilge-water, have made many a brave English sailor food for crabs and sharks." But it is when he attacks the head-quarters of the alleged jobbery and mismanagement that he rises to the height of eloquence—if the eloquence be of a peculiar kind—and thus again his similes get the better of him. "But then the mismanagement of this office" (the Victualling Office), "and of the navy, proceed from the Admiralty, as filthy springs from an impure fountain, these being but branches of that accursed tree that has yielded the nation such sour fruit as to set all our sailors' teeth on edge" (he calls it *edg*). "An office managed, we know not how, nor to what purpose, for I dare engage to pick out as many old women in Wapping that should have managed the affair more for the honour, glory, and advantage of the English nation. The Queen of Sheba, when she gave her visit to Solomon, extolled his wisdom, and his servants. Our Solomon (William) is indeed worthy of honour, who has been the care of Heaven, as these nations have been his, and the Queen of Sheba might justly have done him the same honour, could she have come hither; yet I engage she would have left out the latter part of the compliment, and took little notice of *the sitting of his servants* in the Admiralty, of their virtue or wisdom. She takes no notice of Solomon's nor Hiram's navy, yet the Scripture tells us they were under the conduct of shipmen that had knowledge of the sea; and, in another place, that their loading was apes and peacocks, but tells us nowhere that apes and peacocks had the sovereign command in sea affairs, or that landsmen were proper persons to command men-of-war."

The gentleman who replies to this pamphlet, and whose language bears a strong resemblance to that of Mr. St. Lo, might possibly have objected that these words were not very applicable to Sir Cloudesley Shovel, who was Comptroller of Victualling; to Sir George Rooke and Sir David Mitchell, who were Naval Lords of the Admiralty; to other sailors—like Mr. St. Lo himself—who was a Commissioner; and singularly inappropriate to the Secretary to the Admiralty, Mr. Burchett, who had served some time afloat, and, especially as Secretary to Admiral Russell, afterwards Earl of Orford, the hero of La Hogue. But the defender of the officials never meets him in this way, or by any attempt to disprove his statements. He rails on him in the ordinary *tu quoque* manner, tears off his anonymous cloak, and discloses the features of "Mr. Henry Maydman, of Portsmouth, aged 52," against whom Mr. St. Lo is so wrath because he was a purser and did not confess to it.

Now Mr. Maydman's pamphlet—*The State of the Navy, considered in relation to the Victualling*—was written either by an obscure person, whose statements might be passed by as the mere vapourings of disappointed hope, or it was the work of a man who had an opportunity of learning the truth, and who might be expected to state it, however clumsily. In the first case, we should not hear of any opposition. In the second, a semi-official contradiction might be expected, and if that contradiction fails to meet the facts alleged, there is very good reason to credit them.

Now, Mr. Maydman's pamphlet reached a second edition. Mr. St. Lo—if I may father the rejoinder on him—replies not only semi-officially, but under the direct prompting of Mr. Secretary Burchett, yet he hardly attempts to do more than offer a general denial to Mr. Maydman, his only strong point being his assertion that the Lords of the Admiralty offered Mr. Maydman the opportunity, which he thought proper to decline, of bringing definite charges against definite people. It was for the best of all reasons that nothing better than railing for railing was offered in rebutting the charges of Mr. Maydman, Mr. Hodges, and others. The charges, however wildly put forward, however garnished with ornaments of speech borrowed from the banks of the Thames below bridge, were true to the core, and no one was better aware of it than Mr. St. Lo.

The navy was short of pay, short of victuals, short of the gratitude of the country it served. It too often saw Court influence raise a man, and public service depress him. Parliament made its usual spasmodic efforts and came down heavily on the unfortunates who happened to stand in the way of the momentary squall. It had recently called Sir John Parsons, and his brother commissioners of victualling, before the bar of the House of Commons, and had swept them away—Mr. Maydman says, because "they put guts in the beer, and galls in the beef"—but it all went on just as before. The *tone* was low, a thing it is very easy to depress and very hard to raise. The country put no faith or confidence in its naval servants, and its naval servants, civil and military, fell to the level appointed for them.

The commissioners realised handsome estates out of their various purloinings. Mr. Maydman says that at the Victualling Office there might be seen "an undescended wretch . . . . advanced from threadbare clothes since the Revolution to the sum of 20,000*l.*, got out of a salary of 80*l.*" a year. Sir C. Shovel conceived "there might be villainy in the chest at Chatham." A commissioner who succeeded Mr. St. Lo at Plymouth Dock, in 1708, employed something like twenty-eight men—joiners, wheelwrights, and cabinet-makers—on his private concerns, and when inquiry was made, it was found they had built for him several coaches and carriages, cabinets, bedsteads, wardrobes, couches, chairs, tables, and other furniture, to an amount which occupied several pages of foolscap in enumeration. But though there was terrible work at the Navy Board on the discovery of such a scandal, none of the blame came immediately to "their affectionate friend," Mr. Commissioner Wright. The inferior officers of the yard, who permitted—because they could not help—the peculation, did not escape so easily. "We are," writes the Navy Board, "sorry to find that since you had so little to say for yourselves as to the several matters charged upon you . . . . as indeed you could not have much, the same being generally matters of fact—you should think to amuse us with compliments, flourishes, unusual words, and strained sentences, generally ungrateful, seldom acceptable, and wholly improper in business."

I have seen abundance of official documents which show how the canker of corruption flourished and struck root. The surgeons were known to sell their medicines and medical appliances. The boatswains and carpenters drew stores at Portsmouth, sold them, and drew fresh supplies at Plymouth Dock. The captains and masters must sometimes have shared the plunder. One captain seized a neutral, laden with a valuable cargo. He took from her a large amount

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of rough gold which he distributed amongst his friends and relations for safe custody. It took the Commissioner of Plymouth Dock three weeks' searching in Devon, Somerset, and Cornwall to recover 9000*l.* of it. The feeling of honour, as now interpreted, was then unknown in naval affairs. Captain Ramsay, who commanded a ship lying in the Catwater at Plymouth, fell into the clutches of the sheriff's officers. He gave his word of honour that if he was permitted to go on board his ship for some necessary purpose, he would return into custody; but he no sooner reached her than he defied the deluded officers, and dared them to attempt to take him. For this abominable breach of faith he was commended to the Admiralty by his official superiors, and I could find no sign that the Admiralty took a different view of the transaction. It was at this period no uncommon thing for officers of the navy to be under arrest in gangs on charges of embezzlement, and I cannot find that any station, high or low, connected with the naval service, was exempt from the suspicion, if not from the direct charge, too often proved, of embezzling Government money or Government stores.

It was to mix with men under these charges, or guilty of these corruptions, that St. Lo returned from his French prison and, full of new notions of the fitness of things naval, published his *Bridle to the French King*.

The crying evils under which the military part of the navy then suffered were, the system of impressment, the shortness of the victuals, the irregularity and delay in seamen's pay, and the rapid fouling of ships' bottoms. Of the last I shall say no more than that no one who has not rooted amongst the original records of the navy, can have any conception of the magnitude of the evil; that it took nearly a hundred years to discover and apply the remedy; and that, if there was war to-morrow, I conceive we should have a complete revival of the old complaint.

With Mr. St. Lo's experience of the methods adopted in France, where the king had registered the whole maritime population, and had them under his control on any emergency, it was naturally the manning of our own ships which most exercised his thoughts. He found that whereas in France the maritime population had a recognised duty to the State, and that each man had definite services to perform, his English contemporary either avoided service altogether, or was liable to be dragged off at a moment's notice to spend the rest of his life in men-of-war, on short pay and victuals.

Even landsmen were now and then captured for the sea service, with much the same amount of ceremony which African writers associate with the acquisition of negro slaves. Watermen were impressed out of their boats, leaving their wives and children on the parish. Men from merchant ships, just returned from long voyages, perhaps with ventures of their own on board, were snatched away from their property, and without even licence to see their unhappy families. Colliers from the North fell in with the press ketches in the Swin or at the Gunfleet, and were forced to pick up others how they could, paying as high as thirty or forty shillings per man, for working the ships to London. Ships, with perishable cargoes, entering Plymouth for safety on the return voyage, found themselves the victims of legalised piracy. Their men were captured by the pressgang, and they lay with ruined cargoes in Cawsand Bay or the Catwater. The barges plying from the upper to the lower waters of the river Thames, sent their men who were liable to impressment, on shore at Kingston, and shipped others for the remainder of the journey who were not liable to impressment. They then picked up their own men on the return voyage, having been at the expense of keeping and paying them meanwhile. As a general result, merchant seamen's wages rose to 50*s.* and 3*l.* per month, at a time when the man-of-warsman got but the promise of 25*s.* per month. As an instance of Mr. St. Lo's simplicity of mind in dealing with these questions, we have from him proposals for forcing down the rate of pay in merchant ships. He is of opinion that if laws were made ordering that wages shall not exceed 35*s.* per month in merchant ships, and if proper steps are taken for enforcing the law, the rate may be brought down. The steps proposed by him are ludicrous when we remember that they came from a man of sense, who rose by that attribute to some position in the navy. He thinks that the thing would be done if it were enacted, "that if any private sailor shall demand more than the rates aforesaid, that he may be brought to the office to be erected for registring of shipping and small craft, and thence sent on board one of their Majesty's ships of war, there to serve a year as a pressed man." The marvel is that St. Lo should not have perceived that the man under such a law would "demand" nothing, but would wait for the master—who wanted his services so much as to pay 60*l.* a year for them—to offer. And that, even if he so far forgot himself as to make a demand, the very last thing the master who heard him would do would be to bring him under the law, for he thereby put himself to great trouble and lost his man for certain—the very thing he wanted to avoid.

Mr. St. Lo's proposal was to abolish impressment altogether, a proposal which did credit to his sagacity and good feeling; but it never seems to have struck him that the whole thing was a question of money. Impressment might have died a natural death if offers up to the market value of a seaman's services were made by the Government, and the promises were kept. This flaw in St. Lo's argument will, however, be excusable in the minds of those who have noted that down to the present day, statesmen hope to get the command of services at a lower rate than their equivalent in money.

Mr. St. Lo's proposal was the registry of all shipping in England, from the barge and lighter to the foreign-going merchantman, and to impose a *pro rata* man-tax on them in time of war. It was really—though its author shows no sign of being aware of it—a revival of the ancient custom for manning the King's ships; and excellent as Mr. St. Lo's reasoning is as far as it goes, and plausible as the plan looked on paper, it is not a wonder that it was never carried out, and that the pressgangs worked away as merrily as ever—sometimes, as we shall see, under Mr. St. Lo's very excellent and clever supervision.

A man-tax was as great an anachronism then as the revival of impressment would be now. A money tax would have been infinitely easier of collection, but the popular connection of a naval tax with the late destruction of monarchy, probably forbad its contemplation by Mr. St. Lo, as by his contemporaries. The

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real difficulty was far above and beyond St. Lo's stretch of power or of vision. France was to be beaten on land, and if she were not beaten on land, all victories at sea were, to William's view, absolutely worthless. The statesman's time and thought, and the country's money, went to augment and recruit the land forces: the navy only came in for what might be spared afterwards. No doubt William was sensible enough, when he had leisure, of the vital import of a strong British navy; no doubt also, but that the cry that went up from all departments of the fleet, ultimately made its mark, if only in the establishment of Greenwich Hospital. But St. Lo and his contemporary pamphleteers were only voices in that general cry, and not always to be singled out.

St. Lo might find fault with a purser for exposing the shortcomings of his own department, but he admitted in many official letters, which I have seen, that the purser was right. "I have been fain," he writes when Commissioner, "to take victuals out of the 'Litchfield' and 'Anglesea' for the 'Weymouth,' to supply her, bread being mightily wanted here, and oft-times beer." There being no Government victualling yards such as were founded later, local contractors victualled the fleet through agent victuallers. That ships ran short of food even in the Channel is abundantly clear, and that they were often forced to sea with the certainty of falling short is clear enough also. For all these abuses St. Lo has no remedy, but he can cover his default by abusing the pursers, and he generally does so, both publicly and privately.

As to his opinions relative to officering the ships, he has a word to say in favour of the gentlemen captains, as against the tarpaulins who have nothing beyond their seamanship to recommend them. "There are a great many people," he says, "who have entertained a notion that those bred up in merchantmen are better seamen than those bred up in men-of-war ..... In two years there is more to be learnt in a man-of-war, both as to action, the way of command, and otherwise, than by being seven years in a merchantman; but many hold this" (the former) "argument, hoping thereby to be thought to understand the sea." How many are there, one may ask, even of ruling statesmen, who are now unprepared to argue against Mr. St. Lo? But as to the "gentlemen captains," he says, "The French King, when his fleet is out at sea, is at much greater charge than we, in regard to the encouragement he then gives to his officers, both in pay and provisions, which brings his best nobility to his service, who, when they are sufficiently qualified, are preferred to command, and never makes masters of merchantmen captains of men-of-war, well knowing that there is as great an improbability in most of them to well understand the nature and command of a man-of-war, as 'tis for a gentleman of 500*l.* a year (that perhaps knows well enough to manage his own estate) to understand martial discipline, to command a castle in time of action, or for a captain in the militia to be as fit to make a general officer as one that hath been in several campaigns, sieges, and other actions; and will sooner prefer one of his warrant officers, that has been trained up in his service, than one of them; though that also is very rare, for he will sooner reward them with money for any brave action, and give his commands to people of quality." There was no doubt at the time St. Lo wrote, a great deal of the soundest wisdom in these opinions. Then, and now, there were numerous able landsmen in positions of power, who could not understand that the command of a fighting machine calls for qualities very different indeed from those necessary to the command of a trading or carrying machine. If we applaud the language of a writer 200 years old on this point, how very much must we condemn opposite language at the present time.

My space now draws to a close, and I must not, therefore, stay longer over the examination of St. Lo's opinions. Let me rather conclude, by showing what he became as a government official, when his opinions came into immediate contact with practical necessities. Whether he ultimately fell into the corruptions of his day I do not know; it is suspicious that he should have been dismissed from the commissionership of Chatham Yard in 1714; but so far as I have traced him, he was an upright public servant, according to his lights. Quarrelsome, crochety, and garrulous; unscrupulous in carrying out the public service, but steadfast in attention to it; these were some of the qualities he displayed. Quaint he continued to be at all hazards, as may be gathered from the following items of his public life.

French privateers were in those days more daring than they ever were before or since. They crowded into Hamoaze, and even robbed the wharfs of the Dockyard and Ordnance stores. St. Lo applied that his boat's crew and the watchmen of the yard might be supplied with muskets, instead of the ordinary "Brown Bills." As to his boat's crew he held the arms to be a necessity, "as at his going in and out of the Sound early and late," he ran much danger "of being *knabbed* by some of those lurking fellows."

He could not keep the watchmen of the yard awake by any plans heretofore adopted. No one had as yet proposed the cruel measure of abolishing watch-boxes, nor did St. Lo advise so harsh a proceeding. But he put the watch-box at one end of the watchman's beat, and a bell at the other, and he issued orders that the bells were to be rung every quarter of an hour. It stood to reason that if the bells were not rung at all it would at some time or other come to his knowledge; while if the bells *were* rung, the watchmen could hardly get back to their boxes and go to sleep before the time came to ring again. St. Lo had the pleasure of finding his shrewd simplicity had beaten the drowsiness of the watchmen.

With the naval men who did business with him—always excepting the pursers, of course—St. Lo seems to have kept on good terms. His dockyard subordinates could not have had a pleasant or an easy time with him. I only remember one occasion when his wrath got the better of him with naval people. This was when a ship coming into the new dock, with her guns shotted, let one of them off, apparently at his head, as he walked down towards the ship. His anger was perhaps excusable under the circumstances.

Of his matter-of-fact way of looking at things, I found an instance in his official report of the execution of the 'Benbow's' unhappy captains, Kirby and Wade. These men were coming home under sentence of death, but respited till Queen Anne's pleasure should be known, and were met at Plymouth by orders that they should be shot on arrival. St. Lo writes no special letter, but merely states at the end of his bi-weekly letter to the Admi-

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ralty that "Captains Kirby and Wade arrived here yesterday, and are to be shot on board the 'Bristol' at six o'clock to-morrow."

St. Lo, being powerless to abolish the press, was yet brought face to face with the difficulty of manning the fleet. Sir George Rooke never sent home a ship to be "cleaned and tallowed," that he did not press St. Lo for supplies of seamen. What was he to do? There were a great many outward bound merchantmen in the Sound, in Cawsand Bay, and the Catwater. But there were no men in them; their crews were all in close hiding on shore. If the wind came from the eastward, these men would slip off to their ships, weigh their anchors, and be off to sea under cover of night. St. Lo—the seaman's friend—reported to the Admiralty that it would be a burning shame if nothing was done to capture these men, getting 3*l.* per month, when it might be possible by main force to make them serve the Crown for an ill kept promise of 1*l.* 10*s.* per month. But he had a plan which he disclosed to their lordships, and received a hearty licence to carry out. Commissioner St. Lo, the seamen's friend, the Navy Board's darling, and the enemy of all pursers, issued a proclamation wherein he stated that he deplored the liability of seamen to impressment, and especially deplored the condition of the unmanned outward-bound merchantmen. It was his determination to abolish this state of things, and to establish a registry of the seamen in and about the port. All seamen were invited to inscribe their names in this list, and all such should be freed from the press. Moreover, if any of the captains should accidently or wrongfully press any of these inscribed men, a report to him would bring immediate redress. In order that there should be no mistake, he appointed a certain day on which he would inspect the inscribed men on board their own ships, and would then take proper measures for impressing all those who had not inscribed or who did not put in an appearance.

The proclamation gave great satisfaction, as did a supplementary transaction of which only one half was suffered to transpire. St. Lo sent for two captains and bid them press certain inscribed men. This part of the business he did not think necessary to publish. The captains did as they were bid; they pressed several men out of the merchant-ships. The masters appealed in a rage, and in an apparent rage St. Lo sent for the captains and their wrongfully pressed men. "What was the use," exclaimed the Commissioner, "of issuing orders so flagrantly disobeyed? The men must be at once set at liberty, and he would see what compensation was their due."

The splendid conduct of the Commissioner called forth the plaudits of all who were not in the secret. The men breathed freely, inscribed their names by hundreds, and crammed the ships in the bay. The day appointed came; St. Lo had slept in the Sound on board one of the men-of-war. Long before daylight the captains of the other men-of-war were summoned to meet him. They started in well-armed boats to the unhappy and deluded merchantmen, and before breakfast-time 350 prime seamen were safe under hatches for the service of the fleet under Sir George Rooke!

Such a man was Captain George St. Lo, and such were the times in which he lived.

ROBERT LENDALL.

NOTE BY M. KHANIKOF
ON THE
IDENTIFICATION OF THE NAMES IN THE JOURNEY OF CLAVIJO TO SAMARCAND.

M. KHANIKOF has communicated to us the results of an examination, which he has kindly made at our request, of the names of places traversed by Clavijo during his journey to the court of Timour at Samarcand in 1403 A.D.* and which that old traveller gives in a very corrupt and Hispanicized form. M. Khanikof prefaces his list with some remarks on what he terms the *habitudes d l'oreille* of Clavijo, in transcribing names that were strange to him. He observes that in attempting to pronounce words in an unfamiliar language, one's ear involuntarily strives to give them a form borrowed from the language which is most familiar to us. Besides each of us, through the peculiarity of our auditory organs, perceives certain sounds more easily than others, and strives to introduce them in all the words pronounced. One easily detects these individual peculiarities when one hears an individual speak or read aloud, but when one has to deal with writings, it is only possible to discover these peculiarities of hearing by attentively examining the manner of transcribing strange words of which one knows the true pronunciation.

Clavijo often uses the letter X; but it is evident that he does not intend to apply to it the sound which it has in Spain, that is to say the sound of H in English, but that of Sh in English or of the letter *shin* in Arabic. Thus, at page 93 of Markham's translation of Clavijo, there is the following passage:—"Also there arrives all the silk that is made in the province of Xamahi." [*Otrosi viene la seda que se labra en tierra de Xamahi*†]. This evidently should be *Shamakhi*. Again, at page 99, "and the name of the place was Xaharipreÿ" [*Davia nombre Xahariprey*‡], which is very clearly *Shehri Rei;* as is correctly explained in a foot-note. At page 71 one reads:—"A cavalier, who was the son of a sister of Zaratan, named Xevali" [*Un cavallero fijo de una hermana de Zaratan que avia nombre Xevali*§], which is a Spanish transcription of the name *Sheikh Wali*. At page 79 is the passage, "inhabited by Moorish hermits called Caxixes" [*hermitanos Moros que Claman Caxixes*‖], which is a transcription of the word *Kishish*, a priest. In one place only does Clavijo replace the X by the Arabic letter *jim* or English J. At page 78 he says "On Saturday they passed the night in a town called Pagarrix" [*Otro dia sabado fueron dormir á una aldea que ha nombre Pagarrix*¶]. Now, this is certainly the town marked on the great map of Asia Minor by Kiepert, in latitude 39° 50′ N. and longitude 38° 10′ E. of Paris, under the name of *Pagaridsch;* which is written by Orientals *Pagarij*. These examples amply suffice to fix the sound which Clavijo gives to the X. But they also show that his ear frequently intercalated letters strange to the word, as where he introduces the letter *p* between *Shehri* and *Rei* (see *ante*). Occasionally, too, he suppresses a letter, as in the word *Sheikh Wali*, which he writes as if it was *Shevali* (see *ante*). With Clavijo the letter C, when it precedes A, has always the sound of K, except in a single instance, when he uses it as an aspirate in the word *Carras* (page 80 of translation, 102 of original), a great river, said to be near Ararat, certainly the Araxes, and not the Kur or Cyrus, which is very distant from Ararat. Before *ha, cha* forms the sound *tsha*. Before *u* the *c* again takes the sound *k*, as, for instance, at page 80,** *Calmarin* which is *Kamarlou*, a short distance from the ruins of Armasis,

* *Narrative of the Embassy of Ruy Gonzalez de Clavijo to the Court of Timour at Samarcand* A.D. 1403-6; translated for the first time, and edited, with notes, and a life of Timour, by Clements R. Markham, F.R.G.S. (Hakluyt Society, 1859.)

† Page 114 original. ‡ Page 119 orignal. § Page 93 original. ‖ Page 101 original. ¶ Page 100 original.

** Page 102 of original.

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the ancient capital of Armenia, destroyed to make place for *Toktamysh*, which Clavijo calls here *Tetari*, but to which at the end he gives the real name. But he is mistaken as to the year of the invasion of the Tatars, which took place in 787 A.H. (1385 A.D.), eighteen or nineteen years before the journey of Clavijo, and not, as he says, "eight years ago." Fortunately Clavijo was not pedantic in his system of transcribing strange names, and, in writing his journal every day, he sometimes gives different forms to the same name, which enables us by comparing them, to make out the truth. I will only cite two examples. One is the name of the Oxus. At page 118, he called it *Viadme*, and at page 180 *Biamo*—which it is easy to recognize as *Abi-Amou*. Again, at page 150, he calls the grooms or postillions *Anchos*, and at page 180 *Anchias*. Evidently he has heard the Persian word *Tamtchi*, of which we make in Russian *Tamshtshik*, preserving the meaning of coachman. It is not the same with the word *Xagave*, which only occurs once, in the last line of page 184. According to him this word means "the guide of an ambassador who supplies him with all he requires." If the ear of the gallant old traveller did not retain the termination of the word which is *oul*, and which one often omits in speaking quickly, we may replace it instead of the final *e* in *Xagapul*. In the latter word one may easily recognize the title still used at the court of the Amîr of Bokhara. *Shagavul* means an introducer and guide of an ambassador, an office equivalent to that of *Méhmandar* in Persia.

The following is the list of words given by Clavijo, with the rendering of M. Khanikof:—

Clavijo.	Page.	Line.	M. Khanikof.
Tagiguinia	1	12	The *Duganian* of Arab geographers, a country situated on the left bank of the Oxus, opposite to Balkh, to the South of Soghd, the present Khanate of Bokhara. Other geographers give it a wider extension, equal to that of ancient Bactria. Clavijo seems to take this view, for he says, at page 115, "This city (Anchoy) was beyond the land of Media, in a land called *Tagiguinia*."
Pixara	12	7	Os-ara.
Estalimen	24	17	Limus, in Italian Staleméne.
Xeten	27	19	Shahintkhtassy.
Redea	28	18	Eregli.
Trapea	50	9	Therapia.
Sequello	51	14	Selvi.
Pontoraquia	56	26	Rumli Fener of the Turks, Phanaraka of the modern Greeks, Heracleia Pontica; as suggested in the foot-note.
Espandiar	58-59	17-26	Isfendiar.
Leona	59	24	Cape Vona.
Guirisonda	60	1	Kerasunda.
Corila	60	6	Cape Géurélé.
Viopoli	60	8	Yavebolon.
Pexic	65	5	Pexit, of Kiepert's map.
Pilomasuca	65	14	Polima, of Kiepert's map.
Sigana	65	25	Ziganic, of Kiepert's map.
Alongogaza	68	4	Alanza, 39° 45′ N., 57° 12′ E., on the great map of the Caucasus, on the scale of 10 versts to the inch.
Zaratan	71	6	Mentioned under the name of Taherten, in the history of Tamerlane translated by Petis de la Croix, T. iv., ch. xliv. p 17.
Xevali	71	13	Sheikh Wali.
Pitalibet	72	20	Piralibek.
Xabega	78	8	Shabaghi.
Pagarrix	78	12	Pagaridsch 39° 50′ N. 38° 10′ E. of Paris.
Patir Juan	79	8	Padigman.
Auniqui	79	9	Janikeni
Ischu	79	12	Ascha.
Caxixes	,,	,,	Kishish.
Delularquente	79	15	Delilaba of modern maps.
Corras	80	2	Aroxa.
Naujua	80	5	A village near Kaghizman.
High Castle	80	11	Evidently the castle of Koulpa.
Calmarin	80	16	Kamarlou or Sourmali. Both are near the ruins of Armarir. But Sourmali is nearer the ruins of the ancient capital of Armenia.
Egida	81	30	Igdyr, on the Turkish frontier.
Vasit-calaside	82	29	Bayazid Calassi.
Macas	83	4	Makou.
Sorgart-mix	84	7	Sourghat-mish, a very common Monghol name.
Zanzan Miraxa	84	13	Hamzah Mirza.
Alinga	84	31	A little fort near the fortified village of Kizildza, on the road from Makou to Khoi, visited by M. Khanikof in 1855.
Caza	87	18	Village of Kizildza, but different from the above.
Cusacan	87	24	Kuzàh Kunan, a large village still existing.
Chauscad	87	30	Tshaoushkend, a large town still flourishing.
Zaydana	91	3	Seidanah or Seidabad, a town still existing.
Hujan	91	4	Oudjan, a village celebrated for its thermal springs and pastures.
Santguelana	91	6	Saguilaneh, a village in the environs of Turkmanchai.
Jacares	94	28	Djouher-perver. Nacre, mother-of-pearl.
Gansada	97	8	Khan-zadah, daughter of Aksoufi, of the tribe of Koungrad. Her first husband was Mirza Jehanghir.
Cequesana	97	22	Sheikh San'an.
Xaharcan	98	5	Shahrekan.
Perescote	101	20,27	Firouzkouh.
Vascal	103	29	Bastam.
Ennacora	103	30	Inakturéh, a title still used at Khiva.
Jagaro	104	28	Djoughr of the Arab geographers
Moles	106	14	*Mil*, a post.
Zabrain	107	6	The caravanserai of Zafrain, now in ruins.
Meliaiiorga	108	10	Melikaly Agha.
Ojajan	109	6	Ourta Khan, a town still existing.
Buelo	110	12	Bawerd, or Aliwerd.
Mirabozar	110	30	Miribazar. It is not, as Clavijo supposed, a name, but a title, still in use in Bokhara, for the head of the police in the markets and bazaars.
Hax	113	13	*Ash*, a plate. The Turkmen still pronounce it with a strong aspirate.
Salugar-sujassa	114	16	Salghàr-souïoussy.
Anchoy	115	14	The town of Andkhoi.
Alibed	117	17	Aliabad. A village still existing in the district of Balkh.
Ux	117	19	Oush, a village near Balkh, not to be confounded with the town of the same name in Kokand.
Vaeq	117	21	Balkh.
Termit	119	19	Termad.
Mecer	129	23	Misr, a village colonised with Egyptians, by Timour.
Talicia	130	26	Telli-siah.
Calbet	130	27	Khalvet.
Tangus	134	13	Dongouz, Turkish for a pig.
Bayginar	136	15	Baghi-chenar, mentioned by Baber.
Bagino	138	26	Baghi-nou.
Tagaes	139	28	Tengeh.
Zalaparda	144	14	*Zerreh-peràh*. A gilt shield.
Quenchicano	145	29	Kitshik-Khanúm.

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CLAVIJO.	Page.	Line.	M. KHANIKOF.
Xamalique Mírza	146	19	Shah Malik Mírza.
Hansada	147	4,12,15	The same as *Ganzada*.
Tumanaga	155	34	The word is well written, but Clavijo has mistaken who was the wife most loved by Timour. She was the daughter of the Amír Musa Tandjout.
Dileoltagua	156	1	Timour had two wives whose names began with *Dil*. These were Dilshad Agha and Dilkhush Agha.
Cholpamalaga	156	2	Tshulpan Agha.
Mundagasa	,,	,,	Munsudur Agha.
Vengaraga	,,	,,	Buran Agha.
Ropa-arbaraga	,,	,,	Rouh-pervor Agha.
Meri	170	22	*Miri*, a small coin.
Boyar	179	15	Evidently Bokhara.
Cabria	181	18	Kabrounia de Yakout.
Jagaro	,,	22	Djadjeron.
Vatami	182	27	Veramin.
Baxam Beg	183	1	Pasham Beg.
Assarec	190	29	Near Mianeh there is a place called Hissarek; but there may be another near Tabriz.

M. Khanikof expresses regret that the cartographers of the 17th and 18th centuries did not study the journey of Clavijo; which would have prevented many mistakes that did not disappear from our maps until after Rennel had discovered the itinerary of Forster.

THE LATE SIR JOHN RENNIE.

SIR JOHN RENNIE, C.E., Past-President of the Institution of Civil Engineers, was born August 30th, 1794. He first assisted his father, the late John Rennie, in building both Southwark and Waterloo Bridges. After the death of his father, in 1821, he succeeded him as engineer to the Admiralty, a post he held for ten years. Among his more important works are London Bridge, for which he received the honour of knighthood, Sheerness Dockyard, the completion of Ramsgate Harbour, and Plymouth Breakwater, commenced by his father, the Earl of Lonsdale's docks at Whitehaven, a portion of those of Cardiff, and the carrying out for a number of years of the great system of drainage and land reclamation in the Lincolnshire fens. He was also the author of a noble work on Harbours, and of a monograph on Plymouth Breakwater. In conjunction with his late brother G. Rennie, he contributed to introduce the screw propeller into the Navy, and erected the machinery for the mints of Calcutta, Bombay, and Mexico. They also erected the Royal Clarence Victualling Yard at Gosport, and Sir John Rennie was the first to perceive the uses of the diving bell in engineering works. Sir John Rennie was a high authority on all subjects connected with hydraulic engineering, harbours, canals, drainage, irrigation, the storage of water, and the management of rivers: and his pamphlets on the drainage of Lombardy procured him the order of St. Maurice and St. Lazare. Sir John possessed a wide reputation on the Continent as may be gathered from the fact that he constructed the harbour of Ponte Delgada, in the Azores, that he was a Knight of the Tower and Sword of Portugal, of the Wasa of Sweden, and was also a Member of the Academy of Science of Stockholm, and of the Austrian Society of Civil Engineers. Besides belonging to most of the scientific and learned societies in the metropolis, Sir John was long an active member of the Royal Society and the Meteorological Committee, and one of the Council, and was also chairman of the Juries at the Exhibition of 1862. Of late years, owing to age and increasing infirmities, he retired almost entirely from active life and public notice, and finally died September 3rd, 1874. His kindness of heart won him many friends, and while many will regret his loss, he will have left few enemies. Sir John Rennie was one of the original founders of the old Raleigh Travellers' Club, the forerunner of the Royal Geographical Society.

Reviews.

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ABOLITION OF THE COOLIE TRAFFIC AT MACÁU.*

ON the 20th of December 1873, a royal warrant, issued from the Office of the Portuguese Ministry for Marine, abolished contract emigration of Chinese colonists through the port of the City of Macáu.

This measure is due to the enlightened and philanthropic initiative of the present Minister for Foreign Affairs (and *ad interim* for Marine) in Portugal, the Councillor Andrade Corvo. It was the English press which was very properly the most assiduous in writing deserved eulogiums on this humane resolution of the Portuguese statesman. In Portugal the applause was not less general; and even the most violent of the organs of the party in opposition to that which now directs the affairs of the most faithful kingdom, accepted this measure of the Portuguese minister with decided favour.

Señor João de Andrade Corvo presented a report to the Legislative Session of the Cortes, assembled shortly after the publication of the above-mentioned warrant, in which he minutely studies the facts most directly allied to the coolie traffic, and fully enters into those causes which, while originating the traffic, proved at the same time to be most conducive to its development, and stamped it with the infamous and cruel character which rendered its prompt suppression necessary.

This document, remarkable for the loftiness of its reasoning, for the abundance and exactness of the information it supplies, for the sincerity of exposition and pureness of sentiment which dictate it, merits the best attention, for at least a few moments, of all those persons in the United Kingdom who were most solicitous for the abolition of that traffic, which from motives apart from the will, and foreign to the action of Government, became in Portugal (and it is this which is formally gathered from a perusal of the report) absolutely disgraceful. The Portuguese document is, however, totally unknown in England, the language in which it was necessarily written, to ensure its reaching its intended end, causing it to be but partially accessible to the English reader. It is not possible to reproduce it in its entirety, or even to give copious extracts; we, therefore, propose to endeavour to give our readers a general idea of its contents.

After briefly indicating the causes of the emigration in China, and attributing them less to the superabundance and consequent misery of the population than to the restless and enterprising spirit of the southern inhabitants of the Celestial Empire, and to their natural tendency to seek to improve their condition by labour and speculation; and after pointing out, in passing, the expansibility of the Chinese race, and giving some statistics on the successive progress of the stream of Chinese emigration since 1845, the report proceeds to mention the efforts made for a lengthened period by the English Government for the

* Relatorio e documentos sobre a abolição da emigração de Chinas contratados em Macáu, apresentado ás Cortes na Sessão Legislativa de 1874, pelo Ministro e Secretario d'Estado dos negocios da marinha e ultramar. Lisboa, 1874.

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purpose of diverting those streams to its own sugar-producing colonies, with the object of removing, by the help of Asiatic labourers, that scarcity and considerably enhanced price of labour which was produced by the abolition of the slave trade.

These efforts, as might be expected, did not fail to produce a rapid increase in the emigration of coolies.

Even at this period, however, emigration was not unaccompanied by dangers to the expatriated coolies. Numerous facts prove that grave offences against humanity and justice were practised, and must have continued to be practised in the trade. "Such horrors, miseries, and atrocities of every kind, such horrible mortality, such acts of piracy and assassination have been associated with the transport of coolies to foreign regions, that common humanity will not permit us to remain indifferent to what is passing." So wrote, in 1852, Dr. Bowring, English Consul at Canton, to the Earl of Malmesbury. About a year later, "the Colonial Land and Emigration Commissioners," in a report, denounced the great irregularities and abuses committed in the coolie emigration traffic. The Portuguese Minister does the English Administration due justice in affirming that while encouraging this emigration, it sought to improve its conditions, and that, inspired with "a noble and elevated spirit of humanity," it endeavoured to bring to bear remedies, which, though always prompt, were not always efficacious. The report enumerates some of the English measures, such as an "Act for the Regulation of Chinese Passenger Ships," and the ordinance of the Governor of Hong Kong, in November 1857, which both arose from a resolution to diminish the abuses and defects in the emigration traffic. Notwithstanding these known abuses, the emigration continued on after 1857.

The criminal acts perpetrated by the brokers in order to obtain greater numbers of emigrants, succeeded each other with deplorable frequency. This resulted in the conflicts on board the coolie ships, and the attempts at revolt and arson by the deluded coolies, who were subjected to bad treatment on board, conveyed under the worst hygienic conditions, and allowed an altogether insufficient supply of food, which led to an excessive mortality. "The complaints against the way in which the coolies were treated in Cuba and in Peru were frequent, and gave rise on more than one occasion to international correspondence, and even to the temporary prohibition of the emigration to Peru, in English vessels. In spite of all these officially made complaints, the traffic continued to be maintained on a large scale." The intention of the Portuguese statesman to show that the emigration from Macáu was not the only traffic that was made infamous by heinous excesses, is evident. The emigration by contract, of coolies from Macáu, was begun there some years after it was established in other ports of China, to different tropical countries. The example was first set, in 1851, by two Frenchmen, and was directly followed by a Macáu man. The emigration once set on foot, numerous abuses soon manifested themselves in connection with it. Le Vicomte da Praia Grande, then Governor of Macáu, opposed it with the most energetic and humane measures. The Royal Warrant of the 12th of September 1853, which was the first act of the administration towards regulating this emigration, provided for the health of the colonists, and for the removal of the dangers from epidemics.

But emigration, spontaneous and natural, was not sufficient to satisfy the ever-increasing demand, and all kinds of devices were resorted to for the purpose of inveigling emigrants. Hence impostures and acts of violence, caused by the greed of the agents, increased daily. In November 1855 the Governor of Macáu published a special regulation, with the object of insuring the voluntary character of the emigration. This regulation did not have the desired effect. On the 5th of June 1856 another regulation limited the liberty of the emigration agents and brokers (the principal causes of these abuses), and imposed certain responsibilities on them. Three years later, an edict issued by the Government Council of Macáu censured the abuses introduced into the depôts of coolies, and applied the 1856 regulations to them in all their rigour.

The solicitude of the Portuguese Government to put an end to the innumerable abuses, which were becoming more and more deeply rooted, did not cease here.

Towards the end of 1857 the representatives of England and France, having met together in Canton, concerted fresh measures for the emigration traffic, with a view to making it more regular.

On the 30th of April, 1860, some new regulations, issued by the administration of Macáu, not only contained stipulations analogous to those of Canton, but even extended and improved them in many points. Besides other beneficial provisions, these regulations created a Chinese emigration superintendent. Even on the 12th of October, in the same year, the Governor of Macáu had made some further important and stringent rules respecting ships employed in conveying emigrants, and concerning emigration generally. At this time, and even at later periods, the coolie emigration was not generally looked upon as a criminal trade; and those nations who had the most lively interest in introducing their commerce, by more or less violent means into China, and in the breaking down of the traditional barriers set up by the Imperial Government against all communication with the "barbarians," did not forget to encourage the emigration of Chinese. In 1857 Lord Clarendon recommended the Earl of Elgin to endeavour to obtain from the Emperor of China a formal acknowledgment of the right of his vassals of both sexes and of all classes to quit their country. The "Tien Tsin" treaties obliged the Emperor to issue orders to the superior authorities of the empire to allow the Chinese liberty to embark in either English or French vessels, and to engage to serve as labourers in the colonies and other countries beyond the seas. The Portuguese Minister makes the causes clear that most tend to render the existing regulations ineffectual, and those same causes would operate similarly on any future regulations that might be issued. The emigration, both in its origin and ultimate purpose, will continue to remain out of the reach of the regulations and of the authorities, who watch over the engagements in the ports of embarkation, and endeavour to secure free liberty to all those who are engaged.

The abuses and outrages committed by the brokers increased continually; the catastrophes and crimes on board the ships conveying coolies were multiplied, and filled the world with horror. But in spite of all

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this, public opinion was not then decided, and not definitely adverse to the coolie traffic. It was agreed that in the Pekin conventions—regulations should be introduced securing to the Chinese emigrant the necessary guarantees both for his physical and moral well-being. These regulations were agreed to by the representatives of England and France and Prince Kung on the 5th of March 1866. In the same year the Portuguese Government directed the governor of Macáu, Jose Marea da Ponte e Horta, to announce, at an opportune time, Portugal's determination of adhering to the convention.

Experience proving how useless were the provisions of these regulations, the same governor, on the 2nd of April 1868, named a commission for the purpose of making a fresh set of regulations that should provide more ample guarantees for inspection by the public authorities.

The suggestions of this commission gave rise to the regulations promulgated by the Governor Vice-Admiral Sergio de Souza, on the 24th of August of the same year, 1868. For reasons which would be too lengthy to recapitulate here, even these regulations did not correspond to the exigencies of the circumstances. Notwithstanding all the efforts and goodwill employed, the abuses increased to an enormous degree.

An understanding between the Portuguese and the Chinese authorities, and their combined action thereon, would perhaps have been the best means of diminishing those abuses, such action and the nature of it to be fixed by means of a treaty contracted between His Most Faithful Majesty's Government and the Chinese. Unfortunately, in spite of all the efforts used, no understanding was arrived at, and the convention or treaty though made was not afterwards ratified.

Fatal occurrences which happened during the transport of the coolies, caused the emigration by contract of Chinese, to become each time more and more odious.

In May 1871 the Governor of Macáu appointed a commission to propose such regulations as ought to be adopted to secure the liberty of the coolies, and measures were afterwards adopted conformably to the opinion of the commission. Following in the course begun, the Governor Viscount of S. Januario issued, on the 28th of May 1872, a set of regulations in which all those measures whose efficiency had been proved by experience were embodied. These regulations contained serious defects, but the Viscount of S. Januario modified them from time to time by subsequent measures, all of which tended to the improvement of the emigrant's lot.

The foregoing remarks briefly present the provisions adopted by the Portuguese Government for the purpose of stopping the inhuman practices existing in the coolie trade. They prove the sincerity of the efforts made by the Government of Portugal to stay this emigration, for which they have been more than sufficiently blamed. Public opinion in Europe and even in England did not always do justice either to these efforts or to the goodwill displayed by the Portuguese Government. In a despatch dated the 15th of April 1873, the Governor Viscount de S. Januario complained of the injustice of these opinions, and requested that recourse might be had to arbitration to prove that Portugal had always used the most energetic measures and exerted the most active watchfulness to prevent the frauds and excesses being practised. "The defect of this emigration," added the Viscount, "exists in its origin, that is, in the way in which the coolies were procured from places outside Macáu." The endeavours of the Portuguese Government to destroy the evil, at its root, were naturally futile in every way. This palpable fact did not cause the injustice to cease however. It certainly was not Portugal that was the greatest gainer by this emigration. The streams of emigrants went principally to enrich Spain, Peru, &c. Being largely carried on by means of foreign capital, the traffic most benefited foreign agents and companies. Portugal suffered in credit, however, by the continuance of this state of affairs, and at times was attacked by England with bitter and unjust censures. Seeing itself helpless to correct abuses which baffled the most stringent regulations, the Portuguese Government, supported by public opinion in Portugal, which condemned the traffic, because it considered the abuses which blackened it to be inseparable from it, resolved once and for ever to destroy it. The Royal Warrant of the 28th of December 1873 was brought out to put a final stop to the iniquities of the emigration. The report does not omit to record some of the most cruel and unpardonable facts, such as the cases of the 'Penelope,' of the 'Dolores Ugarte,' of the 'D. Juan,' &c. Impelled by high sentiments of humanity and justice, and confident of meeting corresponding sentiments in the Portuguese Government, the English Government instituted representations for the purpose of abolishing the emigration, and both the latter country and its officials sometimes did justice to the sincerity of the efforts of Portugal. The report points out in passing, the necessity for recording in an international convention the fundamental principles which should be followed with respect to emigrants, not only from Chinese, but from all countries, in order to secure them efficient liberty and protection.

Before concluding, the Portuguese document gives an exposition of the facts most clearly related to the economical and social state of Macáu, both before and after the warrant of the 20th of December. The conclusion gathered from this exposition is, that the true interests of Macáu were, while the emigration existed, sacrificed to an illusive prosperity. From the close study of these economical facts, the Minister proves that not only the highest interests of humanity, but even the material prosperity of Macáu, required that the Portuguese Government should abolish this traffic. The emigration by contract from Macáu, writes the Minister, was not a source of true prosperity, neither was it surrounded by consequences, either social or economical, that could even palliate it (to absolve it would be certainly impossible) owing to its deeply rooted and incurable vices and wickedness. It is plain that the existence of the traffic for a certain number of years created interests which to a limited extent were respectable, and also that the abolition of the trade will bring with it deplorable results to many families. The Portuguese Government, however, promises to use all the means at its disposal to alleviate the evils of this crisis. The last words contain an eloquent appeal to the sentiment of humanity in the Portuguese nation, which has always struggled to place the glory and honour of its name in advance of its interests. The report concludes with

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these noble words:—"In abolishing emigration by contract from Macáu, the government firmly believes it has fulfilled a duty. The evil being once recognised as incurable, it became necessary to put a prompt and effectual stop to it. The traditions and honour of Portugal required this." Two points, we think, at least, are clearly established in the Portuguese report, viz., the sincerity and purity of intention of the Government of Portugal in destroying the abuses of the emigration, and its promptitude and firmness in suppressing it so soon as the facts proved the impossibility of divesting the trade of the excesses that stigmatised it.

DAS AREAL DER HOCH UND TIEFLANDSCHAFTEN EUROPAS. Von *G. A. von Kloeden*. 8vo., pp. 40. 2 maps. Berlin, 1873. (London: Trübner.)

DR. VON KLOEDEN has taken the trouble of computing the area of the lowlands and highlands of Europe, and as our ordinary handbooks are notoriously incorrect where areas are concerned (we forbear to quote instances), we consider it worth while to place before our readers the main results arrived at by the author. Europe, according to Dr. von Kloeden, is bounded towards the east by the Ural Mountains, the Ural River, the Caspian, and the crest of the Caucasus. He includes Candia, and other islands in the Greek Archipelago, but not Waigat Island, Novaya Zemlya, and Iceland. The total area of Europe within these limits amounts to 3,756,460 square statute miles, viz.:—

Continental Trunk	2,740,100	sq. miles.
Peninsulas	835,720	,,
Islands	180,640	,,

Of this area 2,419,950 square miles are supposed to consist of lowlands, and 1,336,510 square miles of highlands, distributed as follows:—

Continental Trunk	Lowlands	2,152,690	sq. miles.
	Highlands	587,410	,,
Peninsulas ...	Lowlands	194,430	,,
	Highlands	641,290	,,
Islands	Lowlands	72,830	,,
	Highlands	107,810	,,

It should, however, be stated that the distinction drawn by the author between highlands and lowlands (or, to give him the benefit of the original German expressions, *Hochland* and *Flachland*) is rather indefinite. He would have rendered a greater service to science had he computed the areas for certain zones of elevation, which would, however, have necessitated the construction of a hypsographical map of the whole of Europe, as that in Berghaus' *Physical Atlas*, besides being on too small a scale, requires thorough revision.

For further details, which are as comprehensive as the most ardent worshipper of figures can possibly desire, we must refer our readers to Dr. von Kloeden's interesting little volume, the value of which is enhanced by a hypsographical map of a large portion of Germany, and by another illustrating the nomenclature of the Alps.

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JAPAN; VIER VORTRAEGE VON EUFEMIA VON KUDRIAFFSKY. 8vo., pp. 202. Vienna, 1874. (London: Trübner.)

THESE lectures were delivered in November 1873, before the "Women's Industrial Society," of Vienna, and their author has done well to place them within the reach of the public at large. Intercourse with the members of the Japanese embassy at Vienna, a careful examination of the Japanese objects exhibited there last year, as well as the study of books, amongst which she particularises Siebold's great work and Mitford's *Tales of Old Japan*, have enabled Madame de Kudriaffsky to obtain a firm grasp of her subject. Her book throughout is full of interest, the information respecting the manners and customs of the people is particularly comprehensive, and a few hours of leisure could hardly be spent more pleasantly than in perusing the pages of this well-written volume.

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RUSSISCHE REVUE, MONATSSCHRIFT FÜR DIE KUNDE RUSSLANDS. *Herausgegeben von Carl Röttger*. IV. Band, 8vo., pp. 576. St. Petersburg, 1874. (London, Trübner & Co.)

THOSE happy times, when nearly every scientific writer in Russia availed himself of German or French, to make known the results of his labours to the outer world, are gone for ever. But whatever our regret may be at so many stores of knowledge being now closed to us in consequence of the almost general observance of a contrary practice, we have no right to complain. Russia is only now doing what other nations did when they abandoned Latin in favour of their native languages, and as Russian is spoken by some seventy millions of human beings, who are slowly but surely advancing to a stage of civilization which will place them on a par with other European nations, there will be no lack of readers for books printed in the vernacular tongue. Yet, it is this very advance which renders information on what is doing amongst such a multitude doubly interesting, and as a knowledge of Russian is possessed only by a few, works, such as that the title of which is given above, and written in a language more generally understood, are deserving of encouragement and support.

The *Russische Revue* is an ably edited monthly magazine, abounding in carefully written articles on the history, the social and material condition, and the geography of the Russian empire: it supplies us with a bibliography, and keeps us *au courant* of the principal events affecting its welfare. Geographical papers form one of its leading features, and amongst those contained in vol. iv., Dr. E. Schmidt's exhaustive and conscientious account of the expedition against Khiva is particularly valuable, and would well repay translation. Amongst other papers of a geographical and statistical nature we may mention Khun's report on a journey through Khiva (1873); Dr. Grimm's Impressions of a medical man during the Khiva campaign; Bock's article on Russian coal-mining; Matthäi's paper on the foreign trade of Russia; Schwanebach's essay on the new municipal laws; Grünwaldt's essay on Trade Societies; a geological sketch of the Crimea; and a paper on the hill tribes of the Caucasus.

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STATISTISCHE UND ANDERE WISSENCHAFTLICHE MITTHEILUNGEN AUS RUSSLAND. 7r. Jahrgang, 8vo., pp. 174. St. Petersburg, 1874.

THE *Statistische Mittheilungen* are reprinted from the St. Petersburg *Kalender* for 1874, and may be likened to the "companion" to the British Almanac, though far less varied in their contents. The present number brings information on the area and population of the empire, a list of towns with their population and distance from the two capitals, a popular paper on the transit of Venus, a profusely laudatory article on Catharine II. and her monument, a very valuable account of the development of the Russian mining industry from 1860 to 1871, and an annotated translation of the Russian law on Bills of Exchange. If amplified into a statistical year-book these *Mittheilungen* would gain much in interest.

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Bibliography.

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SWITZERLAND AND ALPS.

OSENBRÜGGEN (Dr. E.). Wanderstudien aus der Schweiz. 4 Band. 8vo., pp. 332. Schaffhausen, 1874. 4s. (vols. 1 to 4, 15s.)

GRUBE (A. W.) Alpenwanderungen. Fahrten auf hohe u. höchste Alpenspitzen, nach Orignalberichten, für alte u. junge. Freunde de Alpenwelt. 2 vols. 8vo., pp. 498. Illustr. Leipzig, 1874.

COOK'S Tourists' Handbook to Switzerland, *viâ* Paris. 12mo., pp. 210. London, 1874. 2s. 6d.

GLARNO (S. W.) Reisetaschenbuch für Schweizer-Touristen. 16mo., pp., 260. Map. Constanz, 1874. 2s.

DIE Gletscher der Schweiz nach Gebieten u. Gruppen geordnet (Les glaciers de la Suisse rangés par régions et par groupes). Auszug aus d. Gletscherbuche des schweiz. Alpenclubs. 8vo., pp. 112. Luzern, 1874. 3s.

GASTALDI (B.) Studi geologici delle Alpi occidentali. 4to., pp. 64. Plates. Florence, 1874. 4s.

KURTZ (Dr. P. Th.) Führer durch die Dolomitgruppen von Enneberg, Sexten, Ampezzo, &c. 16mo., pp. 114. Map. Gera, 1874. 1s. 6d.

BELGIUM.

CONTY, Spa en poche. Bains et eaux minérales, plaisirs et promenades, &c. Map and illustrations. 18mo., pp. 72. Paris, 1874.

SCANDINAVIA.

A TRIP to Norway in 1873. By "Sixty-one." Illustrated by F. and A. Milbank. 8vo., pp. 122. London, 1874. 6s.

NIELSEN (Y.) Norwegen. Ein Handbuch für Reisende. 16mo., pp. 222. Map. Hamburg, 1874. 7s.

GUIDE du voyageur en Suède et Norwège, précédé d'un aperçu historique et de notices statistiques. 3rd ed. 16mo., pp. 354. Stockholm, 1874. 8s.

LOWER (M. A.) Wayside Notes in Scandinavia. 8vo., pp. 292. London, 1874. 9s.

ASIA.

GOLDSMID (Col. Sir F. J.) Telegraph and Travel: a narrative of the formation and development of telegraphic communications between England and India, with notices of the countries traversed by the Line. Maps and illustrations. 8vo., pp. 688. London, 1874. 21s.

RENAN (E.) Mission de Phenicie. 4to., pp. 887 and Atlas of 70 plates in folio. Paris, 1874. £6 12s.

LOEHNIS (H.) Drei Monate im Orient, 1874. 8vo., pp. 310. Map. London, 1874. 9s.

LE BAS (Ph.) et WADDINGTON (W. H.) Voyage archéologique en Gréce et en Asie Mineure fait pendant, 1843 et 1844. Parts 81 and 82. Paris, 1874.

BACKER (L. de) l'Archipel Indien. Origines, langues, religions, morale, droit public et privé des populations. 8vo., pp. 552. Paris, 1874.

GERLACH (A. J. A.) Nederlandsch Oost Indie. 8vo., pp. 320. The Hague, 1874. 4s. 2d.

JAARBOCK van het mijnwezen in Nederl. Oost-Indie. Uitgeg op last van den minister van kolonien f. 2e. jaargang, 2e. deel. 1873. 8vo., pp. 206, 8 maps. Amsterdam, 1874. 8s. 4.

SACHOT (O.) Pays d'extrême Orient. Siam, Indo-Chine, Chine, Corée. Voyages, histoire, géographie. 8vo., pp. 222. Plates. Paris, 1874.

AFRICA.

SCHWEINFURTH (Dr. G.) Im Herzen Afrikas. Reisen u. Entdeckungen im centralen Aequatorial-Afrika während d. J. 1866—71. 2 vols. 8vo., pp. 1185. Maps and illustrations. Leipzig, 1874. 30s.

MARNO (E.) Reisen im Gebiete des blauen u. weissen Nil, im Egypt. Sudan u. den angrenzenden Negerlaendern, 1869-73. 8vo., pp. 522. 3 maps, 36 plates, &c. Vienna, 1874. 20s.

MÉMORIAL du dépôt général de la guerre, imprimé par ordre du ministre. To. 10, contenant la description géometrique de l'Algerie. 2e. partie. 4to., pp. 418. Map. Paris, 1874.

JOTTINGS en route to Coomassie. 8vo. Map. London, 1874. 1s.

AMERICA.

THE YEARBOOK and Almanac of Canada for 1874, being an Annual Statistical Abstract of the Dominion, and a Register of Legislation and of Public Men in British North America. 8vo., pp. 222. Ottwa, 1874. 2s. 6d.

FLEMING (S.) Canadian Pacific Railway; Report of Progress of the Explorations and Surveys up to January, 1874. 8vo., pp. 302. Maps. Ottawa, 1874.

HISTORY OF GEOGRAPHY.

DIE FORTSCHRITTE auf dem Gebiete der Geographie, 1872-73 (Aus: Vierteljahrs-Revue der Naturwissenschaften von Dr. H. J. Klein). 8vo., pp. 86. Leipzig, 1874. 2s. 6d.

CRISTOFORO COLOMBO avanti la Scoperta dell' America. Atti tre par M. R. 8vo., pp. 52. Genoa, 1874.

ANCIENT GEOGRAPHY.

DESJARDINS (E.) La Table de Peutinger, d'aprés l'original conservé à Vienne; précédée d'une introduction historique et critique. Folio. Plates. Paris, 1874. £7 4s.

PACINI (Prof. S.) Elementi di geografia antica. 16mo., pp. 316. Florence, 1874. 2s.

SURVEYING AND PRODUCTION OF MAPS.

BIBRACH (Capt.) Der Fähnrich als Topograph. Lehrbuch für den Unterricht in der Terrainlehre, im milit. Planzeichnen u. Aufnehmen. 8vo., pp. 182. Illustrations. Berlin, 1874. 5s.

SONNET (L.) Cours élémentaire de topographie, accompagné de 96 vignettes. 18mo., pp. 202. Paris, 1874.

HANDBOOKS.

PÜTZ (Prof. W.) Vergleichende Erd-und Völkerkunde in abgerundeten Gemälden, für Schule u. Haus. 2 ed. 1 bd., 8vo., pp. 618. Cologne, 1874. 6s.

GENERAL STATISTICS.

ANNUAIRE de l'économie politique et de la statistique, 1874, par M. Block, A. Loua, etc. 18mo., pp. 611. Paris, 1874. 5s.

DONNELL (E. S.) Chronological and Statistical History of Cotton. 8vo., pp. 650. New York. £2 2s.

OETTINGEN (A. v.) Die Moralstatistik in ihrer Bedeutung f. e. christl. Socialethik. 2 ed. 8vo., pp. 880. Erlangen, 1874. 15s.

MATHEMATICAL GEOGRAPHY.

BRUHNS (Dr. C.) Astronomisch-geodätische Arbeiten in 1872, 1869, u. 1867. 4to., pp. 230. Leipzig, 1874. 14s.

GENERAL-BERICHT über die Europäische Gradmessung f. d. J. 1873. Zusammengestellt v. d. Central-Bureau. 4to. pp. 50; 6 plates. Berlin, 1874. 4s.

PHYSICAL GEOGRAPHY.

LASAULX (A. v.) Das Erdleben von Herzogenrath am 22 October 1873. Ein Beitrag zur exacten Geologie. Map and 3 plates. 8vo., pp. 164. Bonn, 1874. 4s.

PAULY (Dr. P. Ch.) Climats et endémies. Esquisses de climatologie comparée. 8vo. pp. 754. Paris, 1874.

KUJPER (J.) Handboek van natuurkundige aardrijksbeschrijving. 1e. gedeelte. 8vo. pp. 176. Gorinchem, 1874. 2s. 10d.

MARSH (G. P.). The Earth as modified by human action; a new edition of "Man and Nature." 8vo., pp. 656. London, 1874. 18s.

SCHILLING (Capt. N.) Die beständigen Stömungen in der Luft u. im Meere. Versuch dieselben auf eine gemeinsame Ursache zurückzuführen. 8vo., pp. 56. Berlin, 1874. 1s. 3d.

ANSART (Capt. A.) Essai sur la mécanique des vents et des courants. 8vo., pp. 128. Plates. Brest and Paris, 1874.

DORR (Dr. R.) Uber das Gestaltungsgesetz der Festlandsumrisse und die symetrische Lage der grossen Landmassen. Plates. 2 ed., 8vo., pp. 200. Liegnitz, 1874. 4s. 6d.

CASPARI (O.). Die Thomson'sche Hypothese von der endlichen Temperaturausgleichung im Weltall beleuchtet vom philos. Gesichtspunkte. 8vo., pp. 74. Stuttgart, 1874. 1s. 6d.

ERMAN (A.) u. PETERSEN (H.) die Grundlagen der Gaussichen Theorie u. d. Erscheinungen d. Erdmagnetismus in J. 1829. Mit Berücksichtigung der Säcularvariationen. Hrgs. im Auftrage der Kais. Admiralität. 4to., pp. 44. 13 plates and 6 maps. Berlin, 1874. 6s.

REPERTORIUM für Meteorologie hsg. v. der kais. Akademie der Wissenschaften, red. von Dr. H. Wild. 3 Bd. 4to., pp. 472. 7 plates. St. Petersburg, 1874. 14s. 3d.

FRITZ (H.) Verzeichniss beobachteter Polarlichter. 4to., pp. 256. Vienna, 1873. 12s.

WORLD.

LEVY'S South American, Asiatic and Oceanic business directory of the principal cities and towns in Cuba, Mexico, Central and South America, Australasia, India, China, Japan, and British Columbia. Also the products of each country, imports and exports, customs' tariff, &c. 8vo., pp. 734. New York, 1874. 48s.

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Cartography.

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The Ordnance Survey in 1873.

THE report lately issued by General Sir Henry James enables us to form some idea of the progress of the great national survey, which employs a well-trained body of 20 officers of Royal Engineers, 122 non-commissioned officers, 243 sappers, 1000 civil assistants, and 477 labourers, whose united salaries amount to no less than 111,393*l.* a year.

During the past year an area of 1745 square miles was surveyed in England and Wales, and one of 2118 square miles in Scotland. The total area now completed in the former amounts to 24,877 square miles, that in the latter to 27,829 square miles, and if the present rate of progress is maintained for ten years longer, we shall then be in possession of a map of the entire country which will surpass in minute accuracy that of any other country of equal extent. The surveying operations in England were carried on in Essex, Sussex, Wilts, Derbyshire, Cheshire, Shropshire, Denbighshire and Glamorganshire. In Scotland the survey of the mainland was completed during last year, and the western part of Ross-shire, including the most mountainous part of the highlands, has now been mapped correctly for the first time. The surveying parties are now at work on Skye and Mull, and if the seasons prove favourable, the survey of the entire kingdom will be completed in the course of next year. In Ireland, the revision of the six-inch map was proceeded with in the counties of Carlow and Westmeath, plans of several towns were prepared, the tenement boundaries laid down on 451 six-inch maps for the Valuation Department, and 102 glebes surveyed for the Irish Church Temporalities Commissioners.

Looking to the minuteness with which the surveys are made, the progress recorded above leaves no room for dissatisfaction. Unfortunately, the rate of publication is very much slower. The areas for which parish plans on a scale of 1 : 2500 and six-inch maps were published in the course of 1873, and the state of these publications at the close of the year, may be gathered from the following table :—

		Area published during 1873.	Total Area published on Dec. 31, 1873.
England & Wales	Parish Plans	838	10,601 sq. m.
	6-inch Map	411	16,260 ,,
Scotland . . .	Parish Plans	518	10,612 ,,
	6-inch Map	1154	18,240 ,,

In addition to these there were published fifty-eight sheets of the detailed map of London on the 5-feet scale, eight sheets of the same map on the 1 : 2500 scale, plans of Ashford, Basingstoke, Deal, Folkestone, Macclesfield, Ramsgate, Rhye, Romford, Sandwich, Watford, Winchester, Wokingham, Galway, and Londonderry on a scale of 10 feet to the mile (1 : 500), and of Limerick on half that scale.

The publication of the one-inch map, in which the general public, after all, take most interest, is proceeding far more slowly than could be desired. Sir Henry James explains the delay by referring to the large number of engravers who were employed upon the plan of London, now happily near its completion, and promises to clear away arrears as soon as these engravers shall be set free. This, indeed, is much to be desired, for on referring to the index maps illustrating the progress of work, which are appended to the report, we find that, whilst the existing surveys suffice for filling up 216 complete sheets of the one-inch maps of England (new series) and Scotland, only 150 sheets have been engraved, and of this latter number only 123 are published with the hills. There are thus no less than 66 sheets which might be nearly ready for publication, but have hardly as yet been touched by the engraver. The delay in the publication of the six-inch maps is equally great, for though 52,706 square miles have been surveyed in Great Britain, the published maps only cover an area of 34,500. This indeed is a serious matter, for the maps necessarily lose in value if published years after the survey has been completed. Looking to these arrears we cannot help advising the Ordnance Office to follow the example of the Indian Survey Office, which produces most of its maps by photo-zincography, for although these maps are not equal as regards technical execution to the beautifully engraved sheets of the Ordnance Survey, this drawback is more than compensated for by the rapidity with which the result of the survey is brought before the public. Sir Henry James would be entitled to the thanks of everyone interested in the survey so successfully carried on under his directions, were he to cause preliminary copies of all the sheets of the one-inch map, the drawing of which has been completed, to be issued.

We venture likewise to suggest that a more general application of photo-zincography to the production of the six-inch and other large scale maps might set free a number of artists, whose services would enable him to push on more rapidly the engraving of the one-inch map.

The new sheets of the map of England (new series) are equal in all respects to the sheets of the northern counties published some years past. In the course of the last two years, the engraving of the following sheets was completed with names and contours, viz., 271, 272, 285, 330, 331, 344 and 345. They delineate portions of Surrey, Kent and Hampshire, and the four sheets named last form an excellent map of the Isle of Wight. Sheet 66 of Scotland has been published with hills, and sheets 62 and 63 in outline, with contours. The latter contain the celebrated parallel roads of Glen Roy; the former embraces the greater portion of Kincardineshire, and, as a specimen of hill etching, leaves little to be desired. Seven sheets with hills (34, 65, 66, 74, 79, 82 and 84) have been added to the one-inch map of Ireland.

It is needless to say a word in commendation of the Ordnance Maps, for their correctness and beautiful execution are universally acknowledged. Their utility (we refer here specially to the so-called cadastral plans) will only become fully apparent when our legislators shall have learnt to avail themselves of the facilities they place at their command in everything referring to the transfer or taxation of land.

In addition to producing the maps referred to above, the Ordnance Survey, in the course of last year, prepared a number of maps and plans for the use of the War Office, Admiralty, and the Local Government Boards, supplied the Census Commissioners with areas, engraved the maps required by the Geological Survey, published facsimiles of national manuscripts in photo-zincography, and 5229 photographic views of Jerusalem and Mount Sinai.

Sir Henry James likewise computed the mean height of five Scotch counties, which the contoured 6-inch map enabled him to do with a considerable amount of accuracy. His results are as follows :—

Aberdeen	875 feet
Kincardine	530 ,,
Forfar	856 ,,
Perth and Clackmannan . . .	1144 ,,
Banffshire	965 ,,

The comparison of standards of length was continued at Southampton, the countries concerned having obligingly forwarded their standards to this country to be compared with our standard yard. The principal results obtained were as follows :—

Measure	Inches.	Millimetres.
The Yard	36.000000	914.39179
Ordnance Standard Foot . .	11.999982	304.79681
Indian Standard Foot . . .	12.000100	304.79980
Indian 10-ft. Bar Is . . .	120.002450	3048.03488
Australian 10-ft. Bar OI4 . .	119.998954	3047.94608

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Measure.	Inches.	Millimetres.
Cape of Good Hope 10-ft. standard	119.998298	3047.92941
The Metre	39.370432	1000.00000
Ordnance Metre	39.374928	1000.11420
American Metre, No. 6 . .	39.369459	999.97527
Spanish Four Metre Bar . .	157.497682	4000.40522
The Toise	76.734402	1949.03632
Ordnance Toise	76.739925	1949.17660
Prussian Toise, No. 10. . .	76.734328	1949.03444
The Klafter	74.665254	1896.48043
Ordnance Half Klafter . .	37.329737	948.16681
Milan Copy of Klafter (I. 3) .	74.664528	1896.46195
,, ,, ,, (I. II) .	74.665076	1896.47592

In conclusion, it may interest some of our readers to know that the public can now procure their ordnance maps at an office specially opened for that purpose at 1, St. Martin's Place, and that 7944*l.* were realized during the year from the sale of the maps. If we consider that a single copy of the large map of London costs 82*l.*, and a set of the one-inch maps, as far as published, about 32*l.*, the sales can hardly be called satisfactory. We do not venture to affirm that they would be larger if the price of the one-inch maps were to be reduced by one-half, but in the interest of spreading a taste for well-executed maps amongst the public at large, we should like to see that measure tried. We believe, too, that more success in the sale of the maps might be achieved if the Ordnance Office condescended to avail itself of those means of obtaining publicity which every ordinary tradesman resorts to. Above all, there ought to be a concise catalogue of those maps which may be supposed to be of general interest, and this catalogue ought to be distributed gratuitously, as is done by every private publisher. Moreover, the allowances made to the trade ought to conform to the scale universally adopted throughout the country.

The Alpine Club Map of Switzerland.*

IN 1864 the Alpine Club resolved, on the motion of Mr. R. Macdonald, that a map of Switzerland should be published with special reference to the wants of pedestrians, and the outcome of this resolution is now before us in a beautifully engraved four-sheet map of the most interesting portion of the European Alps. The committee appointed to carry out the intentions of the Club, consisted of Messrs. Leslie Stephen, W. E. Hall, A. Adams-Reilly, F. E. Blackstone, W. Longman, A. W. Moore, E. Whymper, T. Blandford, J. J. Cowell, A. Rivington, and R. C. Nicholls, upon the last of whom devolved the task of arranging and editing the map. The drawing and engraving were undertaken, in the first instance, by the late Dr. Keith Johnston, to whom we are indebted for the north-western and a portion of the north-eastern sheet, but was subsequently entrusted to Mr. Stanford. Both these gentlemen are deserving of commendation for the conscientious care which they have brought to bear upon their task. The progress of the map has been exceedingly slow, even if we take into account the elaborate manner in which the hills are shaded, and we think the Committee of the Club has done wisely in issuing it to the public, although the hill shading on the south-eastern sheet has not yet been completed.

The map, as far as Switzerland is concerned, is based upon General Dufour's beautiful staff map of that country, the character of which is strikingly reflected by it in the delineation of the ground. The adjoining portions of non-Swiss territory are generally based upon official maps. It is curious, though, that the completion of the Government maps of Baden and Würtemberg should have remained unknown to the authors, who were content to derive their information second-hand from Reymann's Map of Central Europe. The Tyrol is still based upon the old Austrian Staff map, which is acknowledged to be full of errors. The Adamello and Ortler groups, however, are taken from Captain Payer's admirable surveys, but more pains might have been taken to bring this portion of the map up to date, especially as respects altitudes, even though it should have been found impossible to gain access to the new contoured survey of the Tyrol, which was begun in 1869, and is already far advanced towards completion. The old Sardinian surveys of Piedmont and Savoy are notoriously defective, and it is gratifying to find that the authors have taken unusual pains to render this portion of their map as correct as possible. Mr. Reilly's original maps of the south side of Monte Rosa, of the Val Pelline and of Mont Blanc, the latest French maps (including the unpublished sheets of the new survey of Savoy, which were kindly placed at the service of the club by the Director of the Dépôt de la Guerre), and Mr. Nichols' laborious examination of the group of the Grand Paradis and neighbouring mountain regions rendered it possible to improve considerably upon existing maps. The extent to which these improvements has been carried may be perceived if we compare the map before us with one of older date, as, for instance, that in Mayr's *Atlas of the Alps* (Edition of 1871).

Had the members of the Alpine Club known that at the very time they were planning the publication of their map, the Swiss Staff Office had already taken in hand a map on the same scale, which has since been published,* they would probably not have assented to Mr. Macdonald's motion. To many it may appear a matter for regret that so much labour should have been bestowed upon the production of two maps of the same country, both drawn on the same scale. Yet, on comparing the maps, sufficient justification may be found for their independent existence, for whilst the Swiss map is distinguished by a bold and vigorous treatment, that of the Alpine Club excels in detail, and possesses the additional advantage of embracing the whole of Savoy, and a considerable portion of Piedmont, with that goal of so many Alpine travellers, Mont Blanc. The minuteness of the map may possibly prove a stumbling block to many, for even a person having good eyes may find himself compelled occasionally to resort to the use of a glass in order to make out the course of some of the less strongly marked mountain paths. The amount of detail given is, however, considered to be absolutely necessary if the map is to prove of real service to the pedestrian, and the Committee of Alpine Climbers appointed by the club to superintend its execution may be accepted as qualified judges in that respect. Greater clearness might no doubt have been secured by choosing a larger scale, but the map would then have been more cumbrous and inconvenient to carry.

The map, in addition to railways, distinguishes five kinds of roads and paths, indicates bridges and ferries, churches and monasteries, castles, ruins, points of view, battle-fields, landing-places, baths, inns in remote localities, and fortifications. It gives, likewise, the names of Roman stations, the sites of lake-dwellings, and of remarkable discoveries of the stone, bronze, iron, and Roman ages. The altitudes are indicated in feet, and the glaciers tinted blue.

There is no doubt that in a work of this kind there should occur many minor errors, and we trust travellers using the map will heartily respond to the invitation of the editor, and communicate with him whenever errors or omissions are discovered by them.

E. G. RAVENSTEIN.

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* The Alpine Club Map of Switzerland, with parts of the Neighbouring Countries, edited by R. C. Nichols, F.S.A., F.R.G.S., under the superintendence of a Committee of the Alpine Club. Scale 1 : 250,000. 4 sheets. London, 1874. Price, in portfolio, 42s.; single sheets, mounted in case, 15s.

* *Ocean Highways*, 1873, p. 210.

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A New Map of Central Asia.*

THE following notice on a new map of Central Asia has been forwarded to us by an esteemed correspondent at Pesth. We may possibly recur to the subject when we shall have had an opportunity of personally examining the map.

"Considering that the Austro-Hungarian Government has neither a political nor a commercial interest in Central Asia, we may look upon it as a proof of true love for science that it has not spared expense in publishing a map of Central Asia, such as the one before us, compiled by the Royal Imperial Military Geographical Institute of Vienna, from the most recent and best Anglo-Russian sources. This (on a scale of 1:3,024,000) consists of twelve detached sheets, No. 1 beginning at Saratof, whilst No. 12 ends with Ganjam, in Eastern Hindustan. We find embodied under the general name of Central Asia a good portion of South Russia and Siberia, of the Caucasus and of the western portion of the Ottoman Empire, as well as of India, Kashmir, and of the surrounding countries. This arrangement may be entirely justified, considering the multifarious interests by which the border countries are connected with the properly called Central Asia—the geographical denomination for Afghanistan, the three Khanates, the recent acquisition of Russia, and the dominion of Amîr Yakub Khan. The German reader may congratulate himself on having got a map to consult, with reference to occurrences, in books as well as in newspapers, referring to Central Asian matters. The chief basis of the map before us was evidently the Russian map published by the Imperial Topographical Institute of St. Petersburg two years ago; but we are glad to miss all the shortcomings of the later one, as the Viennese geographers endeavoured, with partial success, to avail themselves of all recently made discoveries and accessible sources. Thus we find upon sheet 4 the military road laid down by General Lamakin on his way from Kindirly Bay to Kungrat, together with the results of sundry excursions undertaken by Stebnitzki and Radde eastwards of the Balkan to investigate the course of the ancient bed of the Oxus, as well as a few of the prominent rectifications made during the Khiva campaign. The same can be said of sheet 5, where an accurate delineation of the Kara-Tau, with its north-eastern and southern spurs, will be found. Here we miss the fictitious chain of mountains running across the Pamir, and we find a tolerably good sketch of the Alai, after the researches of the late M. Fedchenko. It is a pity, however, that the Bukan-Tau, an important place during the last Russian campaign—although not wanting on the map—has not been made somewhat more prominent. Upon sheet 6 there are still missing the recent discoveries of the English explorers in Eastern Turkistan, although the works of Johnson, Hayward, and Shaw have been partly made use of; but here we find already Kulja incorporated in the Russian possessions—what the St. Petersburg map neglected to do. Many other similar advantages may be noticed in the new cartographical production of the Austro-Hungarian Geographical Institute of Vienna, and if we add that the lithographic work is admirable, as well as that the transcription of proper names is much more correct than upon all previous German and non-German maps of Central Asia, we have said enough in praise of Major-General von Dobner, the able and learned Director of the said Institute.

"V——Y."

* General Karte von Central Asien, bearbeitet nach den besten neuesten Englischen und Russischen Quellen im K. K. Militärisch Geographischen Institute im Wien. 1873.

New Maps.

Kuyper (J.) Atlas der natuurkundige aardrijksbeschrijving (Atlas of Physical Geography). 4to., 16 maps. Gorinchem, 1874. 10s.

Thomson (A.) Atlas of Scripture Geography. 16 maps and letter-press. 12mo., pp. 128. London, 1874. 1s. 6d.

La France en chemin de fer (maps of the six French railways and of each department, showing principal places, roads, railways, rivers, &c.). 8vo., 94 maps. Sceaux and Paris, 1874.

Erhard. Réseau des voies navigables de la France (Navigable Rivers and Canals). Paris, 1874.

Méa (P.) Atlas topographique, agricole, et géologique du département de la Corrèze (Topogr. agricultural and geological Atlas of Corrèze). Publishing in parts. Paris, 1874.

Croquis des routes et chemins de la rive gauche du Rhône à l'échelle de 1,40,000. Lyon, 1874.

Croquis des routes et chemins sur la rive droite de la Saône au nord-ouest de Lyon. 1:40,000. Lyon.

Croquis des terrains compris entre le Rhône et la Saône, 1:40,000. Lyon, 1874.

Erhard Pyrénees-Orientales. Paris, 1874.

Walton. Pyrénées centrales. Carte locale No. 2. (Capvern Bagnères-de-Bigorre and environs.) Paris, 1874.

Erhard, Nouveau plan complet de la forêt de Compiègne (new map of the Forest of Compiègne, with all the changes made during several years past.) Paris, 1874.

Mongy, Plan de la ville de Lille agrandie de la banliene et des comnunes limitrophes. Paris, 1874.

Plan de la ville d'Angers. Angers, 1874.

Guillaud (Ch.) Plan général de la ville de Tours. Tours, 1874.

Bonnamas (L.) Dijon. Plan d'ensemble. 1:5000. Paris, 1874.

Prussia. General Staff Map (1:100,000). Section 86. (Allenstein.) Berlin, 1874. 1s.

Geologische Karte von Preussen. (Geological Map of Prussia aud Thuringia, published by the Prussian Board of Trade.) Scale 1:25,000. Part 5. (Sheets 245, 246, 263.) With notes. Berlin, 1874. 6s.

Karte des Steinkohlenfelder des Niedererzgeb. Kohlenbeckens (Map of the Coal-fields of the lower Erzgebirge, prepared by Mining Officials). 4 sheets and letter-press. Zwickau, 1874. 12s.

Benecke (Dr. E. W.) u. Cohen (Dr. E. C.) Geognostische Karte der Umgegend von Heidelberg. (Geological Map of the environs of Heidelberg, sheet II., Sinsheim.) Strassburg, 1874. 6s.

Schultz. Plan der Stadt Strassburg, 1:5000. Strassburg, 1874. 1s.

Plan der Stadt Wien. (Plan of Vienna and suburbs, from official sources.) Scale 1:5760. 6 sheets. Vienna (Gerold), 1874. 15s.

Situations plan von Karlsbad. (Plan of Karlsbad and environs.) Karlsbad, 1874. 9d.

Benstetten (Baron). Carte archéologique du canton de Vaud. (Archæological Map of Vaud, with 56 pages of explanatory notes.) Toulon, 1874.

Waterstaatskaart van Nederland (Hydrogr. Map of the Netherlands). 1:50,000. Section sneek 1 to 4. The Hague, 1874. 2s. 6d.

Kaart van Gelderland (map of Gelderland, prepared under the superintendence of Dr. F. G. B. van Bleeck, van Rijsewijk). 6 sheets. Arnhem, 1874. 6s. 8d. in sheets, 20s. mounted on rollers.

Braakensiek (A.) Nieuwe Plattegrond van Amsterdam (Plan of Amsterdam). 1 sheet, folio. Amsterdam, 1874. 1s.

Schiaparelli (C.) et E. Mayr. Nuova carta generale del regno d'Italia. (New map of Italy showing political boundaries; for school use.) Scale 1:920.000. 4th ed. 9 sheets. Gotha, 1874. 10s.

Vuillemin (A.) Bassins du Pô et de l'Adige. Paris, 1874.

Malte-Brun (V. A.) Carte de la nouvelle Calédonie et de ses dépendences, avec la Colonie de l'île Nou, d'après la carte de Bouquet de la Grye et des documents officiels. (Map of New Caledonia and its dependencies.) Paris, 1874.

Map showing the Mineral resources of Chattanooga and vicinity. 31 inches by 26. New York, 1874. 25s.

Niox (Capt.) Carte du Mexique, dressée au dépôt de la Guerre. 2 sheets. Paris, 1874.

Albear y Lara (Colonel F. de). Habana (Plan of Havana, surveyed by order of the Government). 2 sheets. Paris, 1874.

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Log Book.

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The Arctic Meeting.—At the meeting of the Royal Geographical Society to receive Lieutenant Payer, on Tuesday, November the 10th, His Royal Highness the Duke of Edinburgh and His Imperial Highness the Czarewitch intends to be present. Lieutenant Payer will be entertained at dinner by the Trinity House on November the 4th.

New Austrian Polar Expeditions.—The success attained by the late Austrian Polar Expedition under Weyprecht and Payer, has kindled the enthusiasm of their countrymen. Offers of support are flowing in from all quarters, and the simultaneous equipment of two expeditions appears to be secured. Captain Payer will be afforded an opportunity of practically testing his opinion that sledge expeditions offer the best chances of success to an expedition desirous of reaching the North Pole. He will land on the east coast of Greenland, the scene of his first explorations, and will then endeavour to push as far north as possible. Count Wilczek, one of the most generous supporters of the late expedition, intends to proceed by ship to New Siberia, thence to make his way to Cape Chelyuskin, the northernmost point of Asia, and finally to penetrate the Arctic in boats. He expects to be able to reach the land supposed by Middendorf to exist in that direction, or, at all events, to determine the eastern termination of Franz-Joseph Land. Both expeditions will be accompanied by men of science.

Drift of the Arctic Ice in 1874.—Captain David Gray, of Peterhead, reports a great and unusual southerly drift of the ice in the Spitzbergen Sea. In May, June, July, and August, its average drift was fully 14 miles a day. In March and April it must have been driving at double that rate. In August Captain Gray was in 79° 45′ N., and found the ice all broken up, whereas in 77° the floes were lying whole and unbroken, showing that the ice further north must have been broken by a swell from the north. There was a dark water sky beyond the pack which stopped Captain Gray, in 79° 45′, and open water to the horizon. Mr. Rickaby, who went on a sporting trip to Spitzbergen, in Mr. Leigh Smith's yacht, the 'Sampson,' reports heavy ice pressed close upon the northern shores, which also points to an unusually strong southerly drift.

Belknap's Deep Sea Soundings in the Pacific.—Preliminary reports have been received by the United States Navy Department from Commander Geo. E. Belknap, who is charged with ascertaining a practicable route for laying a telegraphic cable between Puget Sound and Japan. The reports detail operations carried on between the 9th of June and 28th of July 1874, and are of great interest as they confirm the great depth of the Pacific, and exhibit the powerful action of submarine currents. Commander Belknap proposed to sound homeward on a great circle having its initial point at Kingwasan (Sendai Bay) on the eastern shore of Nippon, and passing through Tanaga, one of the Aleutian Islands. At a distance of 70 miles from Kingwasan the lead sunk to a depth of 1833 fathoms, 30 miles further it sunk to 3427 fathoms, showing a descent of 1594 fathoms in so short a run. At the next cast (145 miles from the starting point) the sinker carried the wire down to a depth of 4643 fathoms without reaching the bottom. When some 500 fathoms of wire had run out the sinker was suddenly swept under the ship's bottom by a strong undercurrent, and all efforts to get the wire clear and keep it from tending underneath were unavailing. The strain upon the reel was very great, and was due, in Commander Belknap's opinion, to the action of a strong undercurrent upon the sinker, which swept it with great force from the ship. The effect of such a current upon a bight of 6 to 7 miles of telegraphic cable would be almost incalculable, and render the process of laying it next to impossible. It was determined, therefore, to give up this track, and to begin a new great circle off Point Komoto, in latitude 40° N. Here, likewise, at a short distance from the land, and as soon as the edge of the Japan stream is crossed, the water deepens rapidly. Casts were made at intervals of 40 miles. The depth of the ocean, at a distance of 120 miles from the initial point, was found to be 3493 fathoms; at 160 miles it was 3587; at 200 miles, 3507; at 240 miles, 4340; at 400 miles, 4,120; at 440 miles, 4411; and at 480 miles, 4655 fathoms. A good specimen of bottom soil was brought up from a depth of 4340 fathoms; but Miller's Casella thermometer came up a perfect wreck, though it successfully withstood the enormous pressure at a depth of 3507 fathoms. On the occasion of the two last casts, the wire was lost, and finding the water to be deepening all the while, and not being able to afford further losses of wire, Commander Belknap resolved to run inshore, and sound back along the coasts of the Kurile Islands * to Point Komoto, then skirt the rest of these islands and the coast of Kamchatka, as far as Cape Shipunski, and finally cross over to the Aleutian Group. The ocean bed along the route thus traced out was found to be very irregular, and the water deepens rapidly the moment the land is left. At a distance of 110 miles (E. by S. ?) from Cape Lopatka, the southern extremity of Kamchatka, the greatest depth (3754 fathoms) was sounded. The sea-bottom, between Kamchatka and the Aleutian Islands forms a ridge, the highest part of which is 1777 fathoms below the surface, and due south of the Commodore's Islands. But further east, 80 miles to the east by south of Agattu, the great and unlooked for depth of 4037 fathoms was found, though 30 miles further on the lead indicated a depth of 2763 fathoms only. On the 19th July Commander Belknap entered the Glory of Russia Bay, in Tanaga, which he examined with a view of ascertaining its suitability of landing a cable, and then proceeded to Unalashka for a supply of coal.

German Expedition to Persia.—We hear that the German Government has resolved to supplement their Transit Observation party at Isfahan by a geographical and archæological expedition in the lesser known districts of Persia. Dr. Andreas of Berlin, accompanied by an assistant-surveyor and a photographer, will be in charge of the party, whose labours, it is believed, will extend over three years. We recommend as a field for summer work the country between the main road from Bushire to Shiráz and the

* Dense columns of smoke were seen to rise out of a crater at the eastern end of Urup.

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Turko-Persian frontier; and for winter, Laristán and the other districts on the west of the gulf, of which little but conjectural maps exist on the whole extent from Bandar-Abbas to Bushire.

The Insurrection in Khokand. — Contentions between the nomadic Kipchaks and Kara Kirgiz and the Sarts or Tajiks have repeatedly disturbed the peace of Khokand. In 1841 the Kipchaks raised Shir Ali on the throne, but he was deposed by Musulman Kul, his prime minister, in 1843, and his son, Khuduyar, the present khan, at that time only sixteen years of age, was placed in his stead. Khuduyar, though a Kara Kirgiz by descent, sided with the Sarts when they rose in rebellion a few years afterwards. The rebellion was suppressed, but Musulman Kul allowed the khan to retain his throne, an act of forbearance which did not prevent the young sovereign from conspiring to take away his minister's life. Musulman Kul succeeded in escaping amongst his friends, but his hastily gathered adherents were beaten at Ikis, near the confluence of Naryn and Syr Daria, and he, with 10,000 Kipchaks, was beheaded. This happened in 1849. The bloody act of repression cowed the Turks, and the Sarts were allowed to remain in power until 1857, when Mollah Khan, a brother of Khuduyar, placed himself at the head of the discontented party, and forced Khuduyar to seek refuge in Tashkent, where he was still recognised as sovereign. Mollah Khan's reign, however, was but of short duration, for, in 1859, he fell under the hands of an assassin, and Alim Kul, his prime minister, ascended the throne. Khuduyar, though aided by Bokhara, vainly endeavoured to regain his lost power, and, as recently as 1863, an entire army of Bokharese was held in check by a handful of Kipchaks, ensconced in the pass of Kara Kulja, near Uzkent. One of the most important acts of Alim Kul's reign was the despatch of a body of troops in aid of the Muhammadans of Kashgar, who had risen against the Chinese. Yakub Beg, the leader of these troops, is the present ruler of Jityshahr.

The appearance of Russia upon the scene of action, changed the course of events. Alim Kul fell in the battle fought under the walls of Tashkent, in 1864, and a portion of his subjects, tired of bloodshed, recalled their former ruler, Khuduyar. Others left the country, and joined Yakub Beg in Kashgar. Khuduyar's first care was to come to terms with the Russians, who already held Khojent, and were within a few days' march of his capital. He succeeded in this, though not without sacrificing much territory, through the good offices of Mirza Khakim Bey, a wealthy merchant, who had learnt to appreciate the power of Russia during a visit to the fair of Nishni Novgorod. A treaty of peace and amity was concluded in 1868, and for several years the relations between the two countries were tolerably satisfactory. Khokand enjoyed several years of peace, and even Abu Rakhim (Abdurahman), the son of the unfortunate Mussulman Kul, lived quietly at the court of his father's murderer. But in 1873 the slumbering enmity of the nomadic tribes was aroused by a tax imposed upon the fruit trees growing wild in the forests. Khan Saidi (Nassyr Eddin Bey), the khan's son, suppressed an attempted rising with ferocious severity, and Khuduyar, on pretence of making amends for his son's harshness, enticed forty Kipchak notables to his court, where he caused them to be assassinated. This act of treachery roused the Kipchaks and Kara Kirgiz into rebellion. They offered to become Russian subjects, but their offer was rejected. They then applied to Yakub Beg, of Kashgar, whom many of them looked upon as their natural chief; but that ruler does not appear to have seriously entertained their advances, though he placed no obstacle in the way of several bands who crossed the frontiers of his territory with a view of assisting the rebels. These latter do not appear to be making much progress; a report has even reached us that a body of them were compelled to seek refuge on Russian territory, where they were disarmed. But they have evidently caused much anxiety to Khuduyar, who has inaugurated a reign of terror at Khokand, not even sparing the life of his own relatives. Moreover, notwithstanding these internal commotions, he appears anxious to pick a quarrel with Russia. Mirza Khan, his former adviser, who was favourable to a Russian alliance, has fallen into disgrace, his place being filled now by Mir Alim Bey, an avowed enemy of Russia. Russian travellers who have recently visited Khokand have been treated with scant courtesy, and if Khuduyar means to act up to his assertion that "he need only draw his sword to compel Russia to retreat in confusion," he may very soon find himself involved in fresh difficulties. Up to the present time the Russians have evidently abstained from any act which might increase his embarrassments, and Abu Kazim, a youthful relation of the khan's, residing at Khojent, to whom the rebels applied with a view of raising him to the throne, has been removed by them to a greater distance from the scene of conflict.

Khiva is destined eventually to be incorporated into the Russian Empire. The khan declares himself powerless to check the raids of the Turkmen, unless assisted by the Russians, and owing to many former sources of revenue having dried up, and the poverty of his subjects, he will not be able to continue paying the instalments of the war indemnity.

We take this opportunity to place on record the astronomical determinations of the principal positions in the oasis of Khiva, for which we are indebted to Captain Solimani, who accompanied the late expedition against the Khanate.

	Latitude.			Longitude E. (Greenwich).		
Kasarma.....	44°	46′	3″	58°	11′	33″
Daulet Girei	44	29	53	58	10	43
Kabanbai	44	13	47	58	16	20
Kaike	44	2	42	58	21	16
Jany-kala	43	33	55	58	39	31
Kungrad.....	43	4	28	58	54	39
Mangyt	42	6	19	60	5	31
Bagh-i-Khan	41	24	0	60	23	14
Kosh-kupir.....	41	32	10	60	22	44
Khiva (Palace) ...	41	22	46	60	24	28
Kazavat	41	33	49	60	12	48
Tash-hauz	41	50·	22	59	59	20
Ilally	41	52	31	59	38	33
Kunia-Urgenj ...	42	18	29	59	9	18
Khanki	41	27	30	60	47	17
Kuvansh-Jarma...	42	27	0	59	33	2

The longitudes depend upon that of Irgiz, which was determined in 1867-68 by Colonel Tillo.

Death of Captain Moreau in Burma.—In our last number we had occasion to notice the death of Captain Fau, an engineer officer of promise, who, with Captain Moreau, had accompanied the French mission to Burma, with the hope of exploring some of the unknown portions of that kingdom. This melan-

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choly event has now been followed by the death of Moreau, who has also fallen a victim to jungle fever while discharging the last duties of friendship in accompanying his friend's corpse to Mandalay.

The Swiss Alpine Club held its annual meeting on the 23rd of August, at Sitten. M. von Torrente, in his opening address, gave an historical and scientific description of the canton of Wallis. M. Zähringer, of Luzern, the President, then read the annual report, from which it appears that the Club now numbers 1712 members, and has 1040*l.* invested in good securities. The meeting resolved to continue the publication of the Club-book on Glaciers, and to devote 240*l.* to an examination of the Rhone glacier. The excursions in 1876 will be directed to the Alps of Glarn and Bünden.

Signor Cora's Journey in Turkey.—Signor Cora proposes to devote the remainder of the autumn to an exploration of various portions of the interior of Albania and Rumelia, of which little is at present known, and which on the best maps are exhibited as mere blanks. The possible commercial and scientific importance of any endeavours to open up a comparatively unknown region in the heart of Europe is very great, and Signor Cora deserves credit for the disinterested energy he is showing in setting about this self-imposed task. According to present arrangements, he will cross over to Avlona, a small town on the coast of Epirus, and thence make his way across the continent to Salonika, taking height observations with an aneroid, and laying down a route survey as he proceeds. He will return to Brindisi by way of Janina and Corfu, or Athens, Corinth and Corfu.

New Map of Arctic North America.—A French missionary, Père Petitot, has just presented to the Paris Geographical Society a map drawn by himself, on the scale of 1 : 75,000, showing the course of the Mackenzie River from the Great Slave Lake to its *embouchure* in the Frozen Ocean. Our readers can appreciate the drawbacks attending any attempt to explore this region, when they call to mind the fearful severity of the climate and great difficulty of communication between the isolated Hudson's Bay forts except in summer. Since 1846, these hardy French missionaries have energetically prosecuted their task of evangelizing the Indians who supply furs to the Hudson's Bay Company, and have taken part in their hunting expeditions, camped beneath the same tents, and eagerly shared their privations and dangers. A series of missions have thus sprung up, which, in 1863, were consolidated into a Vicariate Apostolic, which is, year by year, extending further towards the Arctic Ocean. The Indians inhabiting these parts comprise the Dog-Rib, Hare-Skin, and Slave, and, during his ten years' sojourn among them, Père Petitot has compiled complete vocabularies of their languages. He has also acquired topographical information respecting the northern portion of the continent, inhabited by Esquimaux, and contributes interesting details of various tracts of country not explored previously.

ERRATUM.

In our last number, p. 310, throughout the abstract of Sir George Campbell's paper "On the Peoples between India and China," *for* Siam, *read* Assam.

Correspondence.

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To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—When Lord Hastings held in India the two offices of Governor-General and Commander-in-Chief, the Most Noble the Commander-in-Chief, K.P., used to write formal letters to the Most Noble the Governor-General in Council, K.P., with well-reasoned applications, to which the Most Noble the Governor-General in Council would reply with equal formality, and sometimes with an equally well-reasoned refusal.

Now, I don't want a refusal, whether well or ill-reasoned; but I wish the Editor of the *Geographical Magazine*, C.B. would write a letter to the late Editor of *Ocean Highways* (New Series), C.B., and ask that gentleman—"not to put too fine a point on it"—*What has become of his* INDEX?

I have deferred binding my copy in hope; but hope is waxing faint and my numbers are tumbling to pieces. All owners—at least all users—of those valuable twelve numbers will surely back my application.

Ocean Highways indeed! What sort of highways are those that have neither landmark nor finger-post? Even a benighted Latin Poet seems to have anticipated our hard case, and pointed to the party who is expected to provide a remedy:—

"Caligine tetrâ
Nox vastum premit OCEANUM, dum longius acti
Ludibrio ventis Jacimur: nec se Cynosura
Nec ductrix profert Helice; nobis INDICE dempto
Quis miseris monstrabit ITER, quis lumina reddens
Adstabit CLEMENS superûm?"

Yours faithfully,

ESTOTILAND, *August* 1874. ZICHMNI.

P.S.—Whenever I write my own name I feel as if I had spelt it wrong; but to make sure, you may apply at the Hakluyt Society's Rooms, asking for Nicolo Zeno (the younger).

———:o:———

"TELEGRAPH AND TRAVEL."

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Will you allow me space for a word or two, with reference to Colonel Yule's Review of *Telegraph and Travel*, in your October number?

The map, remarked on in a foot-note, was taken at a late hour, as the best procurable. A revision of the spelling, to have been effective, should have been *thorough;* and it was felt that such procedure would have had its inconveniences. Not every reader would have been necessarily aided thereby in identification of localities; nor would there be, necessarily, difficulty for any to recognize, in the modified nomenclature of the text, the faulty but familiar designation of places heretofore received. As regards the alleged expediency of exceptive orthography, my own humble opinion is that we should make no exception; nor, while simplifying the process of accentuation, by the reduction of signs and points to a *minimum*, should we hesitate to let "Caunpore" and "Calcutta" succumb to the system of transliteration which converts "Muscat" into "Maskat," and "Czar" into "Tsar." Purely conventional spelling in these cases is liable to become matter of legitimate dispute: true spelling, under fixed scientific rules, can hardly labour under a like disadvantage.

For those interested in the question of Caspian timber and Russian domestic architecture, I am bound to state that the figure 3—so pleasantly alluded to by Colonel Yule—should have been 13; as I long since found it written in my diary, when the printer's mistake had become apparent to myself—too late, unfortunately, for correction.—I remain, &c.,

F. J. GOLDSMID.

16*th October* 1874.

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Proceedings of Geographical Societies.

———: o :———

VIENNA GEOGRAPHICAL SOCIETY.

THE AUSTRO-HUNGARIAN POLAR EXPEDITION.

THE Society met on the 29th of September to do honour to the Polar Explorers who had been absent more than two years from their midst. Among those present were the Crown Prince Rudolf, Patron of the Society; Archduke Rainer, President of the Arctic Committee; Count Wilczek; Count Zichy; Admiral Wüllerstorff; Sir Rutherford Alcock; and many other distinguished gentlemen.

The President, Dr. Ferdinand von Hochstetter, opened the proceedings with a most impressive speech, in which he gratefully alluded to the hearty way in which so many, from the Emperor himself downwards, had striven to further the Expedition. In quoting the words of the telegraphic greeting sent by the Emperor to the leaders, Dr. von Hochstetter called upon the meeting to show equal appreciation by rising from their seats as a mark of honour. Papers were then read by Lieutenant Weyprecht on the general events of the expedition, and by Lieutenant Payer on the sledge journeys conducted by himself, and of these we give a full *resumé* below. At the close of the papers, Dr. von Hochstetter formally awarded the Honorary Diploma of the Society to the two leaders, and then read the following letter, which had been received from Sir Henry Rawlinson, President of the Royal Geographical Society:—

To Dr. F. VON HOCHSTETTER, *President of the Imperial Geographical Society of Vienna.*

LONDON, *September 17th*, 1874.

SIR,—As President of the Royal Geographical Society of London, I hasten to convey to you our cordial congratulations on the brilliant success which attended the exploring Expedition of Messrs. Weyprecht and Payer.

The boldness and perseverance with which these officers seem to have conducted their long sledging journeys, after leaving their ship imbedded in the ice, have excited our warmest admiration, and their discovery of land as far north as the 83rd degree of latitude, entitles them to the very highest rank amongst Arctic explorers.

I have the honour to request, Sir, that you will, in my own name, and in that of the Society which I represent, and which has ever taken the liveliest interest in Arctic discovery, convey to Messrs. Weyprecht and Payer our warmest felicitations on their safe return to Austria, and assure them that nowhere are their great services to science more appreciated, or their personal gallantry more admired, than in England, where we have learnt from long and painful experience to estimate the danger as well as the value of successful Polar exploration.—I have, &c.,

(Signed) H. RAWLINSON,
President Royal Geographical Society.

LIEUTENANT WEYPRECHT'S ACCOUNT.

AFTER the departure of the 'Isbjorn,' the 'Tegethoff' steamed away in a north-easterly direction, the ice having been dispersed by a breeze from the same quarter; but towards midnight the breeze fell, and the ship's crew found themselves frozen in, about 6 miles from the coast, in 76° 22′ N. latitude, and 62° 3′ E. longitude. Lieutenant Weyprecht was flattering himself that after the continuance of the sou'-westers which they had experienced, an easterly wind would set in and release them from their fix, instead of which calms, with occasional west winds, prevailed; while the latter brought in their train plenty of snow, which, with the rapid fall in the temperature, cemented the ice-blocks and shut them in inextricably. On the 9th of September a fresh breeze sprung up from the north-east and dispersed the ice into detached floes, but the 'Tegethoff' still remained in the middle, and all efforts to free her by hand or by getting up steam proved fruitless. An E.N.E. breeze drove them rapidly in a W.N.W. direction, as far as 76° 35′ N., and 60° 18′ E. of Greenwich, and then the wind veered round to the S.W. and drove them back. On the 5th of October the coast of Novaya Zemlya was lost to sight, and the pressure of the ice increased so that on the 13th the floe in which they were fixed crumbled to pieces, and the vessel was forced up above the level of the surrounding ice on to her larboard side. During the whole winter the pressure continued, and the constant changes in the position of the ship, as well as the critical state of affairs in general, warned the leaders to prepare for abandoning her in case of need. Accordingly coals and provisions for ten months, two boats, and materials for constructing a house were partly brought up on deck, and part placed on the ice. During the time that the pressure of the ice lasted, *i.e.*, until the end of January, the state of affairs was most disquieting, for the cracks and fissures in the floes made it necessary for the crew continually to shift their quarters, and so little rest was possible that they hardly ever laid aside their clothes. The sun was last seen on the 19th of October, and on the 23rd the windows were covered up, and an awning erected from the mainmast forward, the after part of the vessel being taken up with the provisions and stores, which had to be handy in case of an emergency. A rampart of snow had been erected round the vessel, but this had to be renewed because it was undermined by cracks in the ice. The general health of the party, in spite of these anxieties, was satisfactory; a few cases of scurvy had appeared, it is true, but these soon disappeared with the aid of lime-juice, while Weyprecht did not omit, by exercises and by reading and instruction, to provide against the evils of inaction. The cold was easily borne, though by February the thermometer had sunk to 46° C. During the winter the ship drifted first to the north-east, reaching its most easterly point (73° 18′ E. of Greenwich, and 78° 42′ N. latitude) on the 4th of February 1873, and then to the north-west. On the 16th of February the sun was seen again, but it was not until the 7th of April that the intense cold admitted of the windows being uncovered, and the awning removed. On the 15th of April they began to try and free the vessel; the ice wall round her was removed, and the rudder disengaged, the ship being slightly raised aft, and still leaning over to the larboard side. Weyprecht caused twenty-one holes to be bored in the ice round the vessel, and then endeavoured to make a sort of dock or canal by sawing through the intervening ice. But this proved impossible as the ice was but in few places thin enough for the saw to be of any use; while in a good many instances, after sawing through 12 or 20 feet of ice, down to the water, another layer of ice was discovered below. Heavier and longer saws were brought into play, and chisels and boring implements were used, blasting being even resorted to, but all in vain. Although eventually the fore-part of the vessel lay in a sort of open dock, the after-part was still fixed in ice of prodigious thickness. During the summer the removal of the ice made the head settle down still more, and in August she heeled over to her larboard side as to require to be supported by spars and yards. In September the young ice began to form and necessitated the digging out the vessel being broken off. But the work had shown that the men were in full possession of their strength; and a great number of bears were shot, the flesh of which contributed to keep the party in health.

On the 30th of August, while in 79° 43′ N. latitude, and 60° 23′ E. longitude, an unknown land was discovered,

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extending for some considerable distance westward and northward. It was called by its discoverers Emperor Francis Joseph Land, and a conspicuous promontory was named Cape Tegethoff. During September and October they were driven past the coast, and at the beginning of October crossed the 80th parallel. In the early part of November the floe which had by this time decreased considerably in size, was driven up against one of the islands which fringed the coast, and the 'Tegethoff' was thus frozen in in 79° 51 N., and 58° 56' E. longitude.

An unlucky accident happened on the 28th of March to a sailor named Stiglich, who shot himself badly in the left arm, but owing to the constant care of Dr. Kepes the wound was healed before the return homeward. During the following months the two Norwegian fishing-boats and the second pinnace, averaging each 16 feet long, were got ready for the return, and, as previously mentioned, were fixed upon sledges, each being laden with a good supply of provisions, among which were pemmican, preserved meat, pease-pudding, meal, bread, chocolate (that for eating having been found quite invaluable), and spirits of wine for cooking purposes. All the diaries and zoological collections had unfortunately to be left on board.

On the 20th of May the vessel was abandoned, but the route chosen was so wretchedly bad that half the crew could barely drag along one sledge, or one boat at a time. Every inch of the route had thus to be traversed over five times. Between the ice-blocks there lay deep snow, the surface of which had frozen into a thin crust, and through this the travellers broke at every step. Often they sunk up to their waists, and in order to rest were compelled to lean on their hands and knees. In the teeth of these difficulties progress was very slow, and half a mile was the very utmost that could be done. On the 1st of June an impassable lane of water was reached, and as this necessitated a halt, Weyprecht took the opportunity to return to the ship for the jolly-boat; but it was not till the 17th that a north wind sprung up and dispersed the ice enough for the boats to be launched. During the ensuing week progress was still very slow and wearisome, for the constant alternation of ice and water obliged them ever and anon to take to the sledges and pack the boats or *vice versâ*; while at other times they had to lie idle for days at a time in order to wait for changes in the ice. Moreover, a south wind soon sprung up and baffled their best efforts by driving them back in a contrary direction to that in which they were going. On the 15th of July they found themselves again in the neighbourhood of a small island, only 5 miles from the ship. But a release was at hand. On the same day a north wind set in, and in a few days so much way was made that on the 23rd the 79th parallel of latitude was passed. On the 15th of August the open sea was reached in latitude 77° 40' N., and 61° E. of Greenwich, and the sledges broken up. Each boat's crew was then divided into two watches, who took it in turns to row, and the wind having calmed, the mountains of Novaya Zemlya appeared in sight on the following day. The provisions had now dwindled down to three weeks' supply, but they were so anxious to haste homeward that they did not stop to replenish their stock from the depôt which Count Wilczek had left. On the 18th of August, the Emperor's birthday was again celebrated, though not with such luxurious means as they had at disposal two years before: the boats were drawn up ashore and the night passed on dry land. No vessels were to be seen in the Matochkin Sharr Straits, though Weyprecht had confidently expected to find a Norwegian fishing vessel here, and his hope now was to fall in with a Russian salmon fisher in some of the rivers north of Goose Land. Should this prove in vain it was resolved to make for the White Sea. On the 24th of August, about 6 o'clock in the evening, while in the mouth of the Puhova River (72° 40' N. latitude) they fell in with a boat belonging to the Russian schooner 'Nicolai,' and having been hospitably received by the captain, Feodor Boronin, they chartered the vessel for 1200 roubles to convey them to Vardö, in Norway.

The health bulletin improved from the moment they left the 'Tegethoff.' During the whole period, Weyprecht considers that the behaviour of the crew was most excellent; punishments were very rarely resorted to, while no cases of insubordination occurred. Under the most trying circumstances he never noticed any despondency, and it is a noteworthy fact that the cold was so easily borne that some of the crew never put on their furs.

The scientific results are most extensive, comprising as they do the discovery and partial exploration of a large tract of unknown land, as well as meteorological, magnetic and other observations made during two years at a station far removed from any other.

LIEUTENANT PAYER'S ACCOUNT.

THE object of the Austro-Hungarian Expedition was not the exploration of land north-east of Spitzbergen and Gillis Land, though, as it has turned out, this is the real result of their labours. Their idea was to cruise along the northern coast of Siberia, having been induced to select this route on account of the great successes achieved in this direction by Norwegian fishermen the previous year. But though they reckoned on finding the sea of Kara free from ice, they never went so far as to expect an open Polar Sea. And the justice of their view is confirmed by their researches, which prompts them to go further and declare the futility of any attempts to reach the North Pole by this route.

The 'Tegethoff,' 220 tons, was fitted out for three years, and with a crew of twenty-four men left Bremen on the 13th of June 1872, and Tromsö on the 14th of July. The pack was encountered in 74° 30' N. latitude, which, with the low temperature prevalent, denoted an exceptionally unfavourable year. Immediately after Count Wilczek's departure (as detailed in Weyprecht's narrative) they were shut in, and for fourteen months they were, to use Payer's words, mere passengers on board an ice-floe. After two months' forced inaction, the pressure of the ice began, and compelled constant watches to be set. Although plenty of bears came within the vicinity of the vessel, and sixty-seven of these fell victims to their curiosity, still constant anxiety made the general bill of health anything but a clean one. A hut had been erected out of coal so as to serve as a place of refuge in case of the breaking up of the vessel, but this structure was unfortunately destroyed by a movement of the ice. The year 1873 arrived, but they were still in great perplexity, and having drifted beyond 73° E. longitude imagined that they were being borne towards Siberia. But February came, and with it the wind changed and drove them to the north-west, while soon after the sun re-appeared. Numerous efforts were then made to free the ship from her imprisoning floe, but all proved in vain, and it was then necessary to prop her masts so as to prevent her heeling over entirely. During July north winds had driven them southward, but with the approach of August south winds set in and drove them further to the north.

The Expedition was now in a perfectly new region, but it was nevertheless with much surprise that on the 31st of August they suddenly beheld, at a distance of 14 sea miles, a lofty mass of land loom out of the mist. Icebergs also appeared for the first time. The cracks in the ice were so numerous that no landing could be effected, and for more than a month they were doomed to gaze upon this mysterious land without being able to set foot on it; but towards the end of October they were driven up against Wilczek Island, and all fear of drifting off was, for a time at least, at an end. The long Polar night—125 ordinary nights' length—had now set in, and all thought of exploring the new land had to be abandoned till the spring. The cold proved very severe, the quicksilver remaining frozen for weeks, and

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the darkness in the depth of the winter was intense; but in spite of this 1200 lbs. of fresh meat was got, thanks to the bears. On the 10th of March, Lieutenant Payer set out with six men, three dogs, and a large sledge to explore the western land, and travelling in a north-western direction, ascended Capes Tegethoff and Mc Clintock, and crossed Nordenskiold Fiord, in the interior of which is situated the Sonklar Glacier. The glaciers were grand and desolate, and the dolomite rocks rose in bold outline; their column-like supports sparkling with brilliancy owing to the recent abundance of snow. This dampness also occasioned an abnormal circumstance in Arctic Regions—distances appeared less than reality. During this time the cold was intense; every article of clothing was frozen like metal plates, and strong rum lost all its potency and fluidity. On the 16th preparations were made for a second and more complete exploration, and, on the 24th the party set out northwards. The temperature had risen about 14° R., and Payer accordingly prepared for weak ice, snowdrifts, and other contingencies.

The Lieutenant thus sums up the result of their exploration:—The land discovered was about the size of Spitzbergen, and consisted of two large masses east and west, named Wilczek and Zichy Land respectively, both being indented with numerous fiords, and surrounded with numerous islands. A broad channel named Austria Sound runs northward from Cape Hansa, and separates these two, branching off at about 82° N. latitude into a broad north-easterly opening called Rawlinson Sound, the land on the further side being called Crown Prince Rudolf Land. This sound was followed as far north as Cape Pesth.

The horizontal terraces and bluff table-like mountain summits suggested reminiscences of Abyssinia, and gave this region a character which, in Payer's opinion, bore a strong resemblance to the configuration of North-East Greenland. The average height of the peaks was between 2000 and 3000 feet, but to the south-west the mountains rose to the height of 5000 feet. Between the mountains were vast depressions filled with gigantic Arctic glaciers, and these necessitated a circuitous course. The coast was bordered by cliffs between 100 and 200 feet in height.

In respect of vegetation, there is scarce a poorer land on the face of the globe, Greenland, Spitzbergen, and Novaya Zemlya being all far more favoured. Animal life too, with the exception of bears, is extremely scanty in the south. Driftwood was often met with, but neither in large quantities nor of old date.

The entire mass of land discovered was called after his Imperial Majesty the Emperor Francis Joseph, as chief promoter of the Expedition. Detached capes were named as follows, Cape Koldewey 80° 15′, Cape Frankfort 81° 25, Cape Ritter 80° 45′, Cape Kane 80° 10′, and Cape Fligely 82° 5′ N. latitude. A huge ice-flow of recent formation extended from one side of the sound to the other, and was seamed with fissures and studded with hummocks to such a degree that progress across it was extremely difficult. Without going into details, it may suffice to say that on the 26th of March an extensive island named Salm Island was passed on the 80th parallel. On the 3rd of April the 81st parallel was reached, and five days afterwards the latitude of 81° 37′, which at the time the explorers imagined to be the northernmost known land on the globe. The diminution of provisions warned them to lose no time in pushing northward, and the party was accordingly split into two, one portion remaining in latitude 81° 38′ under the rocky cliffs of Hohenlohe Island, while the others, under the leadership of Payer, crossed over with the dogs to Crown Prince Rudolf Land. Their way lay across the Middendorf glacier, and while traversing it a sailor called Zaninovich, the dogs, and one of the sledges all disappeared down a crevasse. Eventually they were extricated, and Crown Prince Land was reached. Here a surprising change took place in the weather, the sky to the north assumed a dark-blue colour, yellow mists ascended in the sunlight, and the road became easier. The cliffs were covered with thousands of little auks and ducks, while there were traces of bears, hares, and foxes, and seals lay upon the ice. Nevertheless, this was not enough to convince them of the existence of an open Polar Sea. Close to the Auk Cape began open water, and here the extreme beauty of the Arctic scenery appears to have greatly impressed Payer. The 12th of April was the last day of their northward trip. Leaving the sledge on a rocky promontory called Cape Germania, 81° 57′ N., they followed the coast line which here trended to the north-east as far as Cape Fligely (82° 5′ N. latitude). Looking northward the first impression was that the sea was indeed comparatively free from ice and navigable, and Payer thinks that a vessel could have easily pushed northward from Zichy Land for a distance of from 10 to 20 miles. But he hastens to say that this was but a momentary impression, and that *frequent* and *careful* observation would be requisite to confirm any deduction as to the normal character of the sea there. In the distance land was seen which appeared to stretch beyond 83° N. latitude, and to be girt by a sound running north-west and north-east. This was named Petermann Land, and an imposing promontory to the west was called Cape Vienna.

Without venturing any conclusion as to the continuity of the land with Gillis Land, it may be safely asserted that it forms part of an Arctic archipelago. The presence of icebergs within the sounds of Francis Joseph Land, and their absence in the seas around Novaya Zemlya, is a noteworthy fact.

A document was left in a cleft of a rock showing that this region had been visited, and the party set out to regain the ship, 160 miles to the south.

Ladenburg Island was passed, and on reaching Cape Ritter they found that the sea-water had penetrated the lower coating of snow, and that a misty atmosphere, denoting open water, lay before them, as well as over the entrance to an extensive sound, called Markham Sound. The next day they stood on an iceberg, near Hayes Island, and saw open water before them flowing rapidly northward. After wandering a good deal out of their course, they eventually regained the ice, near Cape Frankfort, and on the 10th of April found to their joy that the ship had not drifted away, but was still frozen fast on to the shore of Wilczek Island.

A third expedition was made westward, and from the top of a mountain named Richtofen Peak, they were enabled to see that the new land extended as far as 46° E. longitude, and that it was indented by numerous fiords.

After a base had been measured by Lieutenant Weyprecht, preparations were made for the return homewards, and on the 20th of May the colours were nailed to the mast, and the crew started for the south. The rest of Lieut. Payer's narrative, detailing the return journey, is nearly identical with that of Lieutenant Weyprecht, given above.

NOTICE.

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THE

GEOGRAPHICAL MAGAZINE.

DECEMBER, 1874.

THE ARCTIC EXPEDITION.

HER Majesty's Government, after careful and mature consideration of the subject in all its bearings, have decided upon despatching a naval expedition of discovery next year, to explore the unknown region round the North Pole. This wise and patriotic resolution will receive the warm and hearty approval of every true Briton throughout the length and breadth of the land.

The reasons for the decision are weighty and numerous, but it is satisfactory to know that there has been no undue haste; and that the Government have had the advantage of the experience of former Arctic voyagers, of the knowledge of the leading men of science in this country, and of the opinions of the representatives of the naval service, in forming their conclusions. The late Government had always, to its honour, acknowledged the importance of the objects to be obtained by Arctic discovery, and the late head of the Admiralty is known to have been very favourably disposed towards this most legitimate mode of utilizing our naval resources. He was unfortunate in not having been able, owing to various circumstances, to carry out the intentions which he was known to have entertained, and which would have been consistent with the rest of his naval administration.

It has been reserved for the Conservative Government, by despatching an Arctic Expedition, to adopt a wise measure in full accordance with the wishes alike of the naval service, of men of science, and of the whole people of this country. The experience of previous Arctic voyages had shown their scientific importance and their practical value. The discoveries of Hudson and Edge led to the lucrative Spitzbergen fishery, those of Davis to the fishery in the straits which bear his name, the first voyage of Ross led the way for the whalers into the "North Water" of Baffin's Bay, and those of Parry opened the road to Prince Regent's Inlet, while the despatch of the 'Intrepid' and 'Pioneer,' was the direct cause of the introduction of sharp bows and steam-power in ice navigation. Russian Arctic exploration opened up a valuable ivory trade; and no Arctic voyage has been devoid of practical utility, either direct or indirect. But the scientific objects of Arctic exploration are of still higher importance, especially now that the value of scientific research is fully recognized, and that the duty of the State to further and assist discovery is well understood. The Arctic Committees of the Royal Society and the Royal Geographical Society submitted a memorandum to the Government, in which the scientific results of Arctic exploration are fully explained, and it is sufficient to say that this memorandum is the joint production of Dr. Hooker, the President of the Royal Society, of Dr. Allman, of Mr. Prestwich, of Mr. Norman Lockyer, and of General Strachey, as regards the scientific details; and of Admiral Sherard Osborn, and other experienced Arctic authorities, as regards the practical portion; to show that it was prepared by the most competent persons that could be found in this country. The memorandum contains no "verbose grandiloquence" as has been erroneously stated in the *Times* of November 17th, but is a calm and plain statement of facts, which has carried conviction to the minds of all unprejudiced persons who have read it.

It seems necessary, in passing, to inform our readers that the account of the arguments in this memorandum which is given in the article in the *Times* above alluded to, is utterly incorrect in every particular. This article, which was intended to be mischievous, has entirely failed in its object, and it is, therefore, unnecessary to take further notice of it. But we may remark that, while giving a misleading version of the memorandum of the Arctic Committees, the *Times* has not allowed its readers the opportunity of judging for themselves by publishing that important document. It has appeared in the *Proceedings of the Royal Geographical Society*, and will also be found as an appendix to Captain Markham's *Whaling Cruise in Baffin's Bay*.

The present Government had before them a statement of the scientific and practical results of Arctic exploration, as set forth in the memorandum; they had the opinions of their official naval advisers; the memorial of the Dundee Chamber of Commerce, and they were aware of the almost unanimous feeling of the people of England in favour of the renewal of Arctic discovery. The resumption of this noble work recommended itself on every ground which should influence the judgment of statesmen, and the result of the deliberations of an English Cabinet when the subject was once brought fully before it, did not admit of a doubt.

The Government of Mr. Disraeli must, none the less, be congratulated on the adoption of a measure which will redound so much to its credit, and which will give such universal satisfaction throughout the country. The Arctic expedition will be fitted out at Portsmouth, under the able superintendence of Sir

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Leopold McClintock, and all its details will be arranged by the most experienced living Arctic authorities. It will sail under the most promising auspices, and the navy of England will once more resume its legitimate work in time of peace by adding to the glorious Arctic achievements of former days, and by emulating the deeds of those naval worthies of our nation who have reaped immortal renown in those northern seas.

THE AUSTRO-HUNGARIAN POLAR EXPEDITION.*

IT was not the object of the Austrian Expedition to search for the unknown country which the results of our preliminary expedition, undertaken in 1871, had made it likely would be found to the north of Novaya Zemlya, but to discover a north-east passage. This, its principal object, the Expedition has failed to attain; and the country referred to was discovered instead.

The limited time, as well as the dignity of a scientific meeting require that in the following report all those events of a mere personal nature, and the adventures incidental to every Arctic Expedition, should not be dwelt upon, and this all the more as the limited time will not even permit us to treat facts of scientific interest at as great a length as we should desire.

The 'Tegetthoff,' a screw-steamer of 300 tons, left Bremerhafen on the 13th of June, 1872, furnished with stores and provisions calculated to last about three years. Including Captain Carlsen, the well-known Norwegian navigator, who joined the expedition at Tromsö, in the capacity of ice-mate and harpooneer, the crew numbered twenty-four men all told, amongst whom were sixteen Dalmatian seamen.

On the evening of the 14th of July we left Tromsö, shaping our course towards the north-east. A few days afterwards we doubled the North Cape, and, on the 25th of July, when in 74° 30′ N. latitude, and 48° E. longitude, we reached the edge of the packed ice, the unexpectedly southern position of which we had every right to consider a bad omen.

The masses of ice against which we had to struggle at that time, as well as those which we encountered subsequently, were certainly far less formidable than those with which we had become acquainted five years before, on the coast of Greenland, but they nevertheless seriously obstructed our progress. Large floes, separated by navigable lanes of water, were rarely met with, but immense quantities of broken fragments. Early in August we were actually beset for a few days, so as not to be able to move. Subsequently, however, we regained our liberty, and in latitude 75° N. we reached the open water extending along the coast of Novaya Zemlya. The decreasing temperature and quantities of ice showed, indeed, that the summer of 1872 was the very opposite of that of the year before. Aided by steam-power, we fought our way along the coast, through a second barrier of ice, and only reached open water in the latitude of William Island. When still a little south of that island, we were overtaken by the yacht 'Isbjörn,' in which Count Wilczek had effected his difficult passage from Spitzbergen, in order to establish a depôt for our use near Cape Nassau.

The two vessels kept company as far as the low Barents Island, where compact masses of ice, driven by south-westerly winds towards the coast, barred all progress for a week. Only on the 21st of August, the ice having exhibited symptoms of breaking up, we parted company, and the 'Tegetthoff' steamed slowly away towards the north.

But our hopes were vain! Night found us encompassed on all sides by ice—encompassed for two long and dreary years! Cheerless and barren of all hope the first year lay before us, for we were not any longer discoverers, but doomed to remain as helpless voyagers on a floe of drifting ice.

The unusually severe frost of the autumn of 1872 soon solidified the surrounding fragments of ice, from which neither sawing nor blasting were able to effect our release. All our exertions were frustrated by its incredible elasticity, and by the rapidity with which pieces sawn asunder froze together again. Thus fettered we drifted, at the mercy of the winds, towards the north-east.

Our position was thus sufficiently miserable, but on the 13th of October it became gloomy in the extreme. On that day the lethargy in which everything around us had so long been buried suddenly gave place to active commotion, and thenceforth we were exposed to the fearful pressure of the ice. Many a time we were summoned to be ready to save ourselves in case of the vessel foundering, and all this in the midst of a Polar night, and without knowing whither to turn for safety. Our vessel, however, bravely withstood the pressure, though the floe upon which it was fixed had been uplifted by others, which had forced their way under it, thus raising her aft, and causing her to lean over on the larboard side.

Preparations for passing the winter had by this time been made. The deck was covered with snow, an awning was spread from the mainmast forward; and a rampart of ice fixed round the ship. The latter required to be repaired frequently, in consequence of the havoc caused by the motion of the ice.

Special care was taken to keep the crew employed. Watches were set regularly, exercise was taken and school kept. On Sundays the members of the expedition met for a simple but impressive divine service under the awning, when the Bible was read in Italian, by the light of a train-oil lamp.

Meteorological observations were made regularly; Lieutenant Brosch, Midshipman Orel, Captain Carlsen, Lusina, and Krisch, relieving each other every two hours. The uncertainty of our position rendered it necessary to keep a watch constantly on deck, through whom we were regularly informed of the approach of ice-bears, whose flesh formed a most important addition to our diet. Nevertheless, the sanitary condition on board during the first winter left much to be desired, so that our excellent surgeon, Dr. Kepes, was kept fully occupied. Scurvy and affections of the lungs made their appearance in spite of every precaution, the former partly on account of the occasional congelation of the damp covering our cabin-walls, and partly owing to mental depression brought on by our critical position, and which only disappeared when our prospects became more hopeful, and the summer's work kept every one fully occupied.

* A paper, by Lieut. Payer, read before the Royal Geographical Society, November 10th, 1874.

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Our small stock of wine was reserved for the use of the sick. The rest contented themselves with a daily allowance of artificial wine, which we prepared on board from glycerine, sugar, meat extract, tartaric acid, alcohol, and water. A small plank, suspended over the cabin stove supplied us every week with a little cress and cabbage for the scorbutic. The dogs—whose numbers by that time had been reduced to seven—were lodged on deck, in boxes filled with straw. They were fed, at first, with dried horse-flesh, and subsequently on the flesh of seals and bears.

On the 28th of October the sun disappeared below the horizon, not to rise again for 109 days. All the birds had left us, and during five long winter months we were obliged to burn lamps in our cabins. For weeks it was next to impossible to leave the ship. The Polar night was rarely of that indescribable clearness which has been noticed on land, and by ourselves on the coast of Greenland. Whenever a sudden change of temperature caused the expanse of ice to break up, dense vapours arose from the fissures, which not only further obscured the generally inky sky, but likewise produced that immense amount of precipitation which we experienced, especially during our second winter. A fine snow fell almost continuously. In the course of the winter of 1873-4 it attained a depth of 12 feet, and on the arrival of spring our vessel was completely buried in it, although nearly the whole of the snow which fell during the preceding winter had disappeared during the summer.

Our observations on the evaporation of the ice during the Polar night agree in the main with the results obtained by Parry on Melville Island. The winds nearly balanced each other as regards direction as well as force.

A hut of coal had been built on the ice, to serve as an asylum in case of the vessel being lost, but it was destroyed by a movement of the ice on Christmas Eve, and we considered ourselves fortunate in being permitted to spend Christmas Day itself in undisturbed tranquility, occupied with thoughts of home.

The first day of the new year brought with it no prospect of an early release. We were still drifting towards the north-east, and even imagined that we might be carried to the coast of Siberia. Fate, however, had ordained otherwise, for after we had crossed the 73rd degree of longitude, the wind shifted, and thenceforth, helpless as before, we drifted towards the north-west.

On the 16th of February the sun again made his appearance above the horizon, and on the 25th the pressure of the ice, which had tormented us hitherto, having literally hemmed us in by a wall of craggy ice-mountains, ceased as suddenly as it had begun. The cold continued to be severe: the mean temperature of February was —31° Fahrenheit, and towards the close of that month it reached its height —51° Fahrenheit. But this cold is borne easily, as the cabin affords ready means for warming one's self, and consequently several of our men only reluctantly put on their fur clothes when ordered on deck.

The Polar lights in their ineffable beauty illumined the heavens during the whole of the winter, but diminished in frequency as the days grew longer. They generally appeared in the south, and only rarely was more than one corona seen on the same night. Since the beginning of September they were the only incitation which we received from beyond. Like mighty streams they rushed over the firmament, sometimes from west to east, at others in a contrary direction, and the corona vanished as rapidly as it appeared. They were most intense between 8 and 10 in the evening, and their appearance was never attended by noise. Magnificent lights proved generally the forerunners of bad weather.

The auroras and magnetic phenomena were observed by Lieutenant Weyprecht, who will publish the results at an early date.

In the summer of 1873 our hopes of an early destruction of the floe, and consequent liberation, revived. In the course of the summer we observed a maximum temperature of 45.5° Fahrenheit; the black bulb thermometer occasionally indicated a solar heat of 113° Fahrenheit, and on days like these, when there was no wind, we had a sensation of stinging heat. The mean temperature of the past year had been 2.75° Fahrenheit. Our hopes were based upon the evaporation of the ice caused by the powerful effect of the sun, and upon its destruction by winds and waves, but not upon its melting in a sea the surface temperature of which never rose above freezing point. The progressive conversion of the surface ice into sludge was witnessed by us from day to day, the cliffs and walls of ice crumbling away, and evaporating until nearly the whole surrounding sea was covered with a thick chaotic layer of sludge.

Thus encouraged, we made fresh efforts to regain our liberty, and the months of May, June, July, and August were spent in futile attempts to saw through the ice which surrounded us. But our floe, which had attained a thickness of 40 feet in consequence of other floes forcing themselves underneath it, rendered all our attempts futile. The centre of our vessel, and the uplifted part abaft, remained immovably fixed upon the floe. The surrounding ice and snow having melted away and evaporated to the extent of 12 to 18 feet, we found ourselves fixed at a considerable elevation above the general level, and the danger of being capsized had to be provided against by supporting our masts with strong shears. I ought to state that our floe varied considerably in size from time to time. During the last winter it was shattered almost daily, but congealed again immediately. At the time now referred to (August 1873) it was 5 to 7 miles in diameter.

The northerly winds of July drifted us to the south, as far as latitude 79°, but August saw us again drifting to the north. I ought to state distinctly that nothing justified us in the assumption that the direction of our drift was at any time due to oceanic currents. The winds alone caused it, and a cessation of the wind led to a cessation in the movement of the ice. It struck us as remarkable that the direction in which we drifted was always to leeward, and that our vessel should have slued only to the extent of 1° in azimuth during the four preceding winter months.

In the course of the summer of 1873, when in about 79° N. latitude, and 60° longitude, we drifted over an extensive bank, our soundings, which had hitherto varied between 100 and about 275 fathoms, becoming much less.

The temperature of the sea was measured at different depths, and the use of the dredging apparatus resulted in a small zoological collection, only a portion of which we were able to bring to Europe. Drawings

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of some of the specimens which we had to abandon have, however, been made.

Our hopes that the ice would break up grew less and less every day, though the familiar grating sound which proceeds from the ice giving way was heard frequently, and dark streaks on the horizon pointed to the existence of open fissures. We had already resigned ourselves to the necessity of being obliged to pass a second winter, as inactive and perilous as the first, when the state of affairs all of a sudden underwent a change in our favour.

We had long ago been drifted into a portion of the Arctic Sea which had not previously been visited, but in spite of a careful look-out, we had not been able hitherto to discover land. It was, therefore, an event of no small importance, when, on the 31st of August, we were surprised by the sudden appearance of a mountainous country, about 14 miles to the north, which the mist had, up to that time, concealed from our view.

At that moment all our past anxieties were forgotten; impulsively we hastened towards the land, though fully aware that we should not be able to get further than the edge of our floe. For months we were doomed to suffer the torments of Tantalus. Close to us, and, in fact, almost within reach, was a new Polar land, rich with the promise of discoveries, and yet, drifting as we were at the mercy of the winds, and surrounded by open fissures, we were unable to get any nearer to it.

At length, towards the end of October, we approached within three miles of one of the islands lying off the main mass of the land. Every other consideration was now thrown to the winds, and, making our way over the rugged, hummocky surface of the ice, we, for the first time, placed our foot upon land in latitude 79° 54′ N. The ice covering the sea close to the shore was only one foot in thickness, and it was clear that an open lane of water had existed periodically during the preceding summer. An island more desolate than that which we had reached can hardly be imagined, for snow and ice covered its frozen and débris-covered slopes. But to us it was of such importance that the name of Count Wilczek, the originator of our expedition, was conferred upon it.

The sun had deserted us for the second time on the 22nd of October, but we availed ourselves of the few hours of twilight, vouchsafed to us for a week afterwards, to make a few excursions to a distance of 10 miles from the vessel, without, however, being able to enlarge our knowledge of the new country. Was it merely the southern capes of islands of small extent which we had before us, or a country of large extent? Nor were we able to determine whether the white patches, which we discovered high up between the mountain summits, were glaciers or not.

The increasing darkness of the Polar night for the present rendered every attempt at exploration impossible, and we feared lest northerly winds might drift us far away from our present position, before the approach of spring should enable us to commence our exploratory journeys. Nor was our position at the time at all a safe one. Southerly winds had driven us close to the land, and during the first half of October we still suffered seriously from the pressure of the ice. Our floe was shivered into fragments, and it almost appeared as if the anxious days through which we had passed were about to return. In expectation of an unfortunate issue, we took the same measures of precaution which we had taken during the preceding winter, and were ready to leave the ship at a moment's notice. Fortune, however, did not again forsake us, and we were permitted to pass the second Polar night (125 days in length) without suffering the horrors of the first. There occurred no further pressure from the ice, and our harbourless vessel, fixed to its floe, and surrounded for the first time by icebergs, remained immovable, close within the outer edge of the land-ice, and at a distance of 3 miles from the nearest coast.

This position enabled us to look towards the future with a certain amount of assurance; it rendered existence more endurable, and enabled Weyprecht, Brosch and Orel to determine the magnetic elements with a great amount of accuracy. Orel, moreover, determined the astronomical position of our winter-quarters, which he found to be in latitude 79° 51′ N., and longitude 58° 56′ E. During the winter of 1873-74 much more snow fell than during the preceding one, and snow-drifts, brought on by northerly winds, continued for days. At the height of the Polar night we were scarcely able to distinguish night from day, and were enshrouded in darkness for weeks. Christmas was celebrated in a snow-house, built upon our floe. In January the cold set in again exceedingly severe, and the mercury remained frozen for more than a week. The snow became as hard as pumice, and its surface granular. The petroleum in the glass lamps under the awning froze, the lamps went out, and even our cognac was changed into a solid mass.

The visits of bears were as frequent then as they had been at other seasons of the year; they came close up to the ship, and were killed by regular volleys fired from deck. The bears here are certainly much less ferocious than those we met with in Eastern Greenland, where they not infrequently attacked us, and on one occasion even carried one of the crew out of the ship. Here they generally took to flight as soon as we made our appearance. As regards the disputed question whether bears pass the winter in a dormant state or not, we observed, that amongst the great number shot by us during two winters, there was not a single female, and during our second sledge expedition, in the spring of 1874, we even discovered a tunnel-shaped winter-hole in a snow-cone lying at the foot of a cliff, which was inhabited by a female bear and her cubs. On encountering bears we found it generally most advantageous to fire after they had approached within a distance of 50 or 80 paces.

A portion of the flesh of sixty-seven ice-bears which we killed, amounting altogether to about 12,000 lbs., proved to be the most efficient remedy against the scurvy, from which several of our men were again suffering. The care of our surgeon, as well as the reappearance of the sun, on the 24th of February, saved most of our patients from protracted suffering; but owing to our stock of medicines having become very much reduced, a third winter would certainly have exhibited far more unfavourable results. This consideration, joined to the certainty that our vessel was indissolubly fixed to the floe, which, in the ensuing summer would again drift about at the mercy of the winds, as well as the danger of its capsizing on the melting of the snow, led to the resolution to abandon

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the vessel, towards the end of May, and attempt a return to Europe by means of our boats and sledges. The interval was to be devoted to an exploration of the country by means of sledge expeditions, the fortunate termination of which must be left, in no small measure, to chance. For had the vessel been drifted away during the absence of the explorers they would have been exposed to certain destruction, and the crew remaining on board would have been weakened seriously. But the exploration of the country, lying as it did so invitingly before us, was considered to be worth the risk.

March had arrived, and although the cold was still severe, and the weather by no means favourable, the necessity of making the best of the short space of time at our disposal, induced us to start upon our first sledge expedition. On the 10th of March the Tyrolese Haller and Klotz, the sailors Cattarinich, Lettis, Pospischill, and Lukinovich, three dogs and myself, left the 'Tegetthoff' with our big sledge. We travelled in a north-westerly direction along the coast of the extensive Hall Island, ascended Capes Tegetthoff and McClintock, 2500 feet in height, and traversed the picturesque Nordenskjöld Fiord, the interior of which was bounded by the gigantic ice-wall of the Sonklar glacier. The land before us appeared to be utterly void of life; immense glaciers looked down upon us from between the desolate mountains, which rose boldly in steep doleritic cones and plateaus. Every object around us was clothed in a mantle of glaring white, and the ranges of columns of the symmetrical mountain terraces looked as if they were encrusted with sugar. In no single instance could we see the natural colour of the rock, as in Greenland, Spitzbergen, or Novaya Zemlya. This was owing to the immense precipitation and the moisture of the air, which condensed on coming into contact with the cold surface of the cliffs. The unusual moisture of the air, moreover, caused us frequently to over-estimate distances, which is quite contrary to the usual Arctic experience. Perfectly clear days were exceedingly rare.

The cold during this journey was very great, and amounted on one occasion to —58° Fahrenheit (on board ship it was —46·25° Fahrenheit). We were bound to exercise the greatest precaution; our nightly rest in the tent was disturbed, and the crossing of the Sonklar glacier, during a slight wind, was exceedingly painful. Our clothes were as stiff as a coat of mail, and even our rum, strong as it was, appeared to have lost both potency and fluidity. We slept in fur coats, but in the daytime we found that clothes made of the skins of birds were best adapted for resisting the rigour of the climate. In spite of every precaution, however, we suffered much from frostbites, against which a mixture of iodine and collodion proved most efficacious.

Immediately on our return to the vessel, on the 16th of March, we set about making preparations for a second sledge expedition, which was to extend over thirty days, and was to be devoted to an exploration of the land in the north. Soon afterwards one of our companions (Mr. Krisch, the engineer) succumbed to a protracted tuberculosis of the lungs, aggravated by scurvy. On the 19th we buried him in a lonely spot surrounded by columnar basalt, and erected a wooden cross upon his grave.

On the 24th of March we started for the north. Our party included Mr. Orel, the two Tyrolese, three sailors (Zaninovich, Sussich, Lukinovich), and myself. We all wore snow spectacles, blinkers, masks covering half the face, knitted woollen gloves, and sail-cloth boots. We were armed with double-barrelled Lefaucher rifles having a calibre of 12^{mm} and firing explosive bullets and steel-pointed projectiles. In preparing our equipment we followed explicitly the advice given by Admiral Sir Leopold McClintock, and the successful issue of our expedition is due, largely, to this circumstance.

Our team of dogs, unfortunately, was not any longer complete, and only three of them assisted us in dragging the large sledge, which carried stores and provisions weighing 16 cwts. The rest of the dogs were either dead or incapable of rendering service, but even the three remaining ones, being powerful animals, proved valuable auxiliaries.

The temperature during this journey, quite contrary to our expectations, did not fall below —26·50° Fahrenheit, but snowdrifts and moisture, the opening of fissures in the ice, and the flooding of our path by the sea, gave us much trouble.

The results of this journey cannot be fully appreciated without reference to maps and sketches, and anticipating the chronological order of our report, we will at once state that the newly-discovered country equals Spitzbergen in extent, and consists of several larger masses of land—Wilczek Land in the east, Zichy Land in the west—which are intersected by numerous fiords, and skirted by a large number of islands.

A wide sound—Austria Sound—separates these masses of land. It extends north from Cape Hansa to about latitude 82° N., where Rawlinson Sound forks off towards the north-east. The latter we were able to trace with the eye as far as Cape Buda-Pest.

The tide rises about 2 feet in Austria Sound, and exercises but a small effect, merely causing the bay-ice to break near the coasts. Dolerite is the prevailing rock. Its broad, horizontal sheets and the steep table-mountains, which recall the Ambas of Abyssinia, impart to the country its peculiar physiognomy. Its geological features coincide with those of portions of North-Eastern Greenland. A tertiary carboniferous sandstone occurs in both, but only small beds of brown-coal were discovered. On the other hand, amygdaloid rocks, which are so frequent in North-Eastern Greenland, were not met with in Francis-Joseph Land, and whilst the rocks in the south were frequently aphanitic in their texture, and resembled true basalt, those in the north were coarse-grained and contained nepheline.

It is an established fact that portions of North-Eastern Greenland, Novaya Zemlya, and Siberia, are being slowly upheaved, and it was therefore very interesting to meet with raised beaches along the shores of Austria Sound, which attested that a similar upheaval was taking place here likewise.

The mountains, as a rule, attain a height of 2000 or 3000 feet, and only towards the south-west do they appear to attain an altitude of 5000 feet. The extensive depressions between the mountain-ranges are covered with glaciers of those gigantic proportions only met with in the Arctic Regions. Only in a few instances were we able to determine the daily motion of the glaciers by direct measurements. On the coast they usually form mural precipices, 100 to 200 feet in height. The Dove Glacier on Wilczek Land is

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undoubtedly one of the most considerable of the Arctic Regions.

The glaciers visited by us were characterised by their greenish blue colour, the paucity of crevasses, an extraordinarily coarse-grained ice, a small development of moraines, slow motion, and the considerable thickness of the annual layers. The *névé*, or glacial region above the snow-line, was much less elevated above the sea than in Greenland or Spitzbergen.

Another peculiarity which characterises all the low islands in the Austria Sound, is their being covered by a glacial cap.

The vegetation is far poorer than that of Greenland, Spitzbergen, or Novaya Zemlya, and excepting in the Antarctic Regions, no country exists on the face of the earth which is poorer in that respect. The general physiognomy of the flora (but not that of the species) resembled that met with in the Alps at an altitude of 9000 or 10,000 feet. The season during which we visited the country was certainly that in which vegetable life first puts forth its appearance, and most of the slopes were still covered with snow, but even the most favoured spots near the sea-level, which were no longer covered with snow, were unable to induce us to arrive at a different conclusion. On level spots even we scarcely met with anything but poor and solitary bunches of grass, a few species of saxifrage, and *Silene acaulis*. Dense carpets of mosses and lichens were more abundant, but most abundant of all was a lichen, the winterly *Umbilicaria arctica*.

Driftwood, mostly of an old date, was met with on many occasions, but only in very small quantities. We once saw, lying only a trifle higher than the water-line, the trunk of a larch, about a foot thick and some 10 feet in length. The driftwood, like our vessel, had probably been carried to these latitudes by the winds, in all likelihood from Siberia, and not by currents.

The country, as might have been supposed, has no human inhabitants, and in its southern portion scarcely any animal excepting ice-bears are met with.

Many portions of the newly-discovered country are exceedingly beautiful, though it bears throughout the impress of Arctic rigidity.

Our first sledge journey, as well as those undertaken subsequently, convinced us of the difficulty which any future expedition would meet with in discovering a harbour to winter in, no locality suitable for such a purpose having been discovered by us.

It has always been a maxim of Arctic explorers to name their discoveries in honour of the promoters of their enterprise, or of their predecessors. The countries discovered may never become of commercial importance, but the only manner in which I was able to record my gratitude towards those who had devoted their means to the success of our expedition, consisted in connecting their names with the newly-discovered countries. The name of H.M. Francis Joseph was consequently bestowed upon the whole of the country discovered by us, and other names to its several parts.

Owing to the mist which generally hung over the ice, we should not have been able to trace the northerly direction of the Austria Sound, had we not frequently ascended high mountains. The ascents of Capes Koldewey (80° 15′), Frankfurt (80° 25′), Ritter (80° 45′), Kane (81° 10′), and Fligely (82° 5′), moreover enabled us to survey the surrounding country and to select the most suitable tracks to follow.

An uninterrupted expanse of ice, with numerous icebergs scattered over its surface, extended from coast to coast. It was evidently of recent formation, and numerous fissures, and barriers formed of hummocks, crossed it in many places, and constituted serious obstacles to our progress, which we were able to surmount only at a vast expenditure of time and labour. Our track then led over this expanse of ice and starting from Cape Frankfurt, at the portal of Austria Sound, it led us through regions with respect to which we had learnt nothing during our first sledge journey. Omitting, for the present, all details concerning our journey, it may suffice to state that we crossed the 80th degree of latitude on the 26th of March, reached the latitude of 81° on the 3rd of April, and observed, five days afterwards, the latitude of 81° 37′. We imagined at that time that we had approached nearer to the Pole on land than had ever been done before, for we were not then aware that the American Expedition under Hall had reached 82° 9′ N. on land, and 82° 26′ by sea, the year before.

To the south-east of Crown Prince Rudolf Land we turned into the vast Rawlinson Sound, which promised to lead us almost straight to the north. But we soon got entangled in a chaotic mass of ice, which, owing to its height, prevented us from seeing the land, and through which it required our utmost exertions to force our way. The small horizontal intensity of the needle, moreover, which is but natural in such a high latitude, repeatedly made us lose our way, and finding that the hillocks of ice became more formidable in proportion as we advanced, we changed our course, and returned to the Austria Sound. We frequently encountered ice-bears whilst in Rawlinson Sound. They came towards us whenever they caught sight of us, and fell an easy prey to our rifles.

The decrease of our provisions and the want of time at our disposal, made forced marches necessary, and necessitated a separation of our party. The large sledge, with Haller and four others, was left behind in latitude 81° 38′, under a cliff of Hohenlohe Island, whilst Orel, Zaninovich, and myself, with the dog-sledge and half the tent, continued the journey. The sledge was now drawn by two dogs only, the third, a Lapland reindeer dog, having some time previously perished in a snowstorm. Haller was ordered to wait a fortnight for our return, and then to make the best of his way back to the vessel.

Our first aim was to cross Crown Prince Rudolf Land in a northerly direction. This necessitated our crossing the extensive Middendorf Glacier, which past experience and the great cold justified us in believing to be possible, and we at once set about it. After a laborious journey along the long terminal cliff of the glacier, we at length succeeded in gaining its surface, but had scarcely proceeded a hundred paces, when an immense crevasse swallowed up Zaninovich, the dogs, and the heavily-laden sledge. Mr. Orel, fortunately, had remained some distance behind, and I escaped a similar fate by cutting through my harness. Not being able by myself to extricate those engulfed, I ran back to Hohenlohe Island, 12 miles distant, whence I quickly returned with the rest of our party. By means of long ropes we succeeded at length in raising man, dogs, and sledge to the surface, and were fortunate in being able to continue our journey on the following day without having sustained serious injury.

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The men returned to the depôt; and our small party, having abandoned the treacherous surface of the glacier, gained the western coast of the island by a circuitous path, along which we travelled to the north. Here we were destined to witness a most striking change in the aspect of nature. A water sky, of a dusky colour, made its appearance in the north; foul, yellow vapours collected below the sun, the temperature rose, the ground under our feet became soft, and the snowdrifts broke under us with a rumbling noise. We had previously noticed the flight of birds from the the north—here we found the rocks covered with thousands of auks and divers. They rose before us in immense swarms, and filled the air with the noise of their vehement whizzing, for breeding-time had arrived. Traces of bears, hares, and foxes were met with everywhere, and seals reposed sluggishly upon the ice. We were justified, therefore, in believing that open water was near at hand, but personal observations which we were able to make on the following day, after we had ascended the hills, and the results of which I have embodied in a sketch, showed that even our not very sanguine expectations, as regarded the extent of open water, were not realized.

Our track, henceforth, was far from safe. We were no longer travelling over old ice, but over a crust of young ice, hardly 1 or 2 inches thick, covered with salt, very flexible, and crossed by veritable walls, built up of fragments resulting from recent fractures of the ice.

We tied ourselves to the rope, carried our things separately, opened a path with the axe, and continually examined the thickness of the crust which bore us.

We rounded Auk Cape, which resembled a gigantic aviary, and reached the two lonely rocky towers of the Cape of Columns. Here we first found open water extending along the coast.

This distant world was sublime in its beauty. From a height we looked down upon the dark sheet of open water, dotted with icebergs like so many pearls. Heavy clouds hung in the sky, through which penetrated the glowing rays of the sun, causing the water to sparkle; and above was reflected the image of another sun, but of a paler hue. At an apparently immense height the ice-mountains of Crown Prince Rudolf Land, bathed in a roseate hue, stood out clearly visible through the rolling mists.

The 12th of April was the last day of our advance to the north, and, although not perfectly bright, it was more so than most of its predecessors. The thermometer stood at +54·50° Fahrenheit.

From the Cape of Columns, owing to the open water referred to, it was not any longer practicable to travel over the ice, and we were compelled to take to the hills.

On starting, we buried our baggage in the crevasse of a glacier, in which we had slept, and where it was safe from prowling ice-bears, and with the dog-sledge we travelled over a snow-field towards the hills, which were 1000 to 3000 feet in height. On reaching the prominent, rocky Cape Germania, observed the meridional altitude (81° 57′ N.). Here we left the sledge, and, tied to the rope, crossed the *névé* of a glacier, which descended in gigantic steps towards our left. But the many crevasses which obstructed our path, and into which we broke frequently, as well as the certainty of having reached latitude 82° 5′ N. after a march of 5 hours since noon, induced us to abandon further discovery, and having pushed to the north for seventeen days, we halted on the height of Cape Fligely.

We were now in a position to judge of the extent of coast-water. It turned out to be a "polynia" bounded by old ice, within which floated ice-masses of recent formation.

As I am anxious on this occasion to confine myself to a record of facts, I abstain from entering upon a discussion concerning the navigableness and nature of those portions of the Arctic Ocean which have not hitherto been seen by anyone.

There cannot, however, be any doubt that the facts observed and the sight upon which we looked from Cape Fligely, spoke as little in favour of the theory of those who believe in the existence of an open Polar Sea, as of those who maintain that the Polar basin is covered with ice throughout the year. The truth will probably be found to lie between these two extremes. The hope of finding a navigable sea in latitudes not hitherto attained, is not yet extinct, and is most likely to be realized by hugging the coast, but depends in a large measure upon a favourable year.

The success of an expedition sent out to attain the highest possible latitude depends, moreover, largely upon the route selected. The plan of penetrating through Smith Sound, which has been advocated in this country, appears to offer most advantages in these respects. Any theoretical reasons adduced in favour of this route are seconded most powerfully by the fact that a very high latitude has been reached here on repeated occasions. If an expedition should succeed in reaching a winter-harbour in a latitude as high as that reached by the last American expedition, it would then be in a position, by means of extensive sledge-journeys along the coast, to reach a latitude in the course of spring, the attainment of which would be attended by far greater difficulties along any other route.

Our own track to the north of Novaya Zemlya carries no weight in considering this question, for we are indebted for our progress to a floe of ice and not to our own exertions. The difficulties which any succeeding navigator would have to contend with on this route may be estimated from the fact, that on our return we found the sea encumbered with ice to such an extent that even boat navigation was hardly possible, and we were obliged to haul up our boats many hundred times, and drag them over the ice. We certainly should not have been able to return in our vessel, although the summer of 1874 was exceptionally favourable.

But if an expedition be fitted out, not with a view of reaching the highest possible latitude, but to study the nature of Arctic countries, then the interior of Greenland would certainly appear to be deserving of the first consideration.

But our neighbourhood was at that time of more immediate interest to us than the question of the navigableness of a remote portion of the Arctic Ocean. We had before us extensive lands, covered with mountains, and bounding a wide sound stretching towards the north-east, which we were able to trace as far as latitude 83° N. where the imposing Cape Vienna forms the western extremity of a country upon which I conferred the name of Petermann, to whom geographical

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science, and particularly Arctic explorers, are so largely indebted.

Crown Prince Rudolf Land extended towards the north-east, its furthest visible point being a cloud-wrapped rocky promontory, in latitude 82° 20′ N., named in honour of Admiral Sherard Osborn.

Two other localities visited by us, but not on this occasion, were named after two other renowned English navigators, viz., Admirals Collinson and Back.

We do not desire to start any fresh theory with reference to the distribution of land around the Pole, but the coasts, as well as the gigantic glaciers, certainly gave us the impression of having entered a group of islands of considerable extent, thus partly confirming Petermann's theory of an Arctic archipelago.

The innumerable icebergs met with in all the fiords of Francis-Joseph Land formed a remarkable feature, for to the south of it—that is in the Novaya Zemlya Sea—scarcely any were met with. We are not in a position to ascribe the presence of these icebergs to ocean-currents, though their absence in the Novaya Zemlya Sea would appear to point to their finding an outlet towards the north.

Having planted the Austro-Hungarian banner upon the furthest point reached by us, and deposited a document testifying our presence in a cleft of the rocks, we turned back towards our vessel, which lay some 160 miles to the south.

Having rejoined our comrades, who anxiously waited for our return, at Hohenlohe Island, forced marches, and a deliverance from all impediments, excepting the tent and provisions, soon brought us to lower latitudes. But after we had crossed the glaciers of the imposing Ladenburg Island, and reached Cape Ritter (19th April), we were disquieted by the observation that the sea water had permeated the lower layer of snow, whilst a dark water-sky hung over the broad entrance to the Markham Sound. On retiring to rest we distinctly heard the grinding noise of ice, and the surge beating against the shore.

The next day found us on an iceberg, not far from the Hayes Islands. with open water in front of us, and no boat to cross it. The water set rapidly towards the north, owing, probably, to the tide. The southern portion of Austria Sound had been converted into a "polynia," and at a distance of thirty paces from where we stood the surf lashed the ice. After erring about for two days, during a fearful snowstorm, we managed, by following the land and the mural terminations of glaciers to get round this open water, which shut off our return, and it was with a feeling of deliverance that we again stepped upon the solid ice near Cape Frankfurt. Our last apprehensions were removed when we found that our vessel had not drifted away, and on the 24th of April we again met the 'Tegetthoff,' on the very spot to the south of Wilczek Island where we had left her thirty days before. A few days had necessarily to be devoted to repose; for although we had eaten the flesh of eight bears, which we killed during our journey, this addition to our diet was not sufficient to counterbalance the reduction in our strength brought about by the extraordinary exertions which we were called upon to undergo, when dragging a sledge for eight to ten hours at a stretch, and a night's rest of only five hours' duration.

Our third sledge journey was devoted to an exploration of the extensive McClintock Island. Brosch, Haller, and myself, with the dog-sledge, joined in it. When about 40 miles to the west of our ship we ascended a high mountain, and were able to survey the country as far as about longitude 46° E. It was mountainous in character, the mountains again bearing a great resemblance to the Ambas of Abyssinia, and attained its culminating point in the Richthofen Peak, about 5000 feet in height. Closely packed ice covered the sea towards the south, as far as the eye could reach, and rendered our prospects of a speedy return home by no means cheerful.

On the termination of this journey, Lieutenant Weyprecht measured a base-line on the ice near the ship, and we then considered that we had done everything in our power to accomplish the objects of the expedition, and our thoughts were directed exclusively upon our return home.

The period immediately before starting was devoted to recruiting our strength. We took leave of the grave of our departed comrade, and of the country which the caprice of a floe of ice had enabled us to discover. On the 20th of May, in the evening, the flags were nailed to the masts—an affecting scene for all of us—and we started upon our return home.

IRRIGATION IN SOUTHERN INDIA.

THE TAMRAPARNI SYSTEM.

IN our last number we endeavoured to describe a project by which the thirsty plains of Madura, on the eastern side of the Indian peninsula, will some day receive the longed-for moisture from the surplus floods which are now poured uselessly into the western backwaters. We now propose to go a little further south, and treat of the district of Tinnevelli, which does receive a sufficient supply, and where the only questions are how best to preserve and utilize it.* The Tamraparni is the only river south of the Kaveri which receives its supplies from the S.W. monsoon. The Vaigai, in Madura, does not yet, as we have already seen. South of it are the two rivers of Gundu in Madura, and Vaipar with its tributaries, draining the northern *taluks* of Tinnevelli, which have their sources on the eastern slopes of the mountains, and beyond the reach of the S.W. monsoon. Their supplies are consequently scanty and uncertain. On the Gundu the waters from the local rains, the whole amount of which does not exceed 18 inches in the year, are turned to advantage, by a large but loosely-built stone dam of great antiquity, east of the town of Kamudi, and 18 miles from the sea. Here a channel carries off the waters of the Gundu in an easterly direction, to the Kallavi Lake. The river is useful to the villages near its banks, though the supply of water is very uncertain. Several stone *anicuts* and temporary dams across the beds of the Vaipar and its tributaries replenish the tanks, on which all depends. The Vaipar system thus supplies the two northern *taluks* or districts of Tinnevelli, called Strivilliputtur and Sottar. The soil is a fine black

* The map facing page 329, in our last number, shows the position of the Tinnevelli district, and the general course of its principal river, the Tamraparni.

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mould of great fertility, yielding crops of cotton, tobacco, gram, and coriander; and the black sand contains iron ore, whence iron used to be extensively forged at several places, especially at Rajapaleijam, and exported to the fairs of Travankur.

South of the Vaipar comes the Tamraparni, the one really perennial river on the east side of the Indian peninsula, south of the Kaveri. The feeders of this river have their sources in the forest-clad mountains which separate Tinnevelli from Travankur, and sufficiently distant from their eastern scarps to be within the area covered by the S.W. monsoon rains. It is this circumstance which causes the prosperity of Tinnevelli. The rivers Tamraparni and Chittar pour the volumes of their waters down the cataracts at Paupanasam and Kurtallum respectively, and unite on the plain, where they give rise to a bright green belt, some miles in width, on either side of their banks. These rivers are the principal sources of the fertility of the district of Tinnevelli, the most southern in British India, which covers an area of 5176 square miles, and has a population of 1,693,959 souls.

The first duty of the Government, in connection with this system of water supply, is to preserve the forests from destruction, in the mountain ridge which divides Tinnevelli from Travankur. Near Cape Comorin the isolated masses of weather-beaten rock rise abruptly from the plain, and form an outline of battlements and pinnacles against the sky. The continuous range only commences north of the Aramboli Pass, where the mountains attain a height of 3000 feet and upwards. Further to the north are the frowning mass of Maha-Indra-giri, and the sharp pointed cone of Agustia-mulla, 6200 feet above the sea, on which Mr. Allan Broun, the eminent astronomer to the Raja of Travankur, perched his observatory. There is a notable difference in the climate on either side of these mountains. On the west side the slopes are abundantly watered by the S.W. monsoon, and the streams fall into the Travankur backwaters, supplying the narrow strip of land with ample means of irrigation. On these Travankur hills, therefore, clearing may be carried on to any extent without detriment to the low country. In February 1874, the coffee planters were clearing 10,000 acres on the western side of the frontier hills. But, on the east side, the due supply of water for the tanks and channels is a necessary of life to the people inhabiting the Tinnevelli plain. Indiscriminate felling on these eastern slopes would lead to most deplorable results, and the evil has already been partially felt. As long ago as in 1865 it was urged that too much felling must lessen the rainfall; and that, in clearing for coffee or other cultivation, 50 yards of forest at least should be left on the margins of streams. The work of destruction went on. The forests were thrown open to charcoal-burners and firewood-cutters, and any one who obtained a license might cut and hack as he pleased. People stripped certain trees of their bark, and cut down others to get the honey that might hang on the branches. The net annual forest revenue in Tinnevelli is only 340*l.*; a sum which, even from this lowest point of view, can scarcely be put in comparison with 100,000*l.* of revenue derived from the water supply that depends upon the due conservancy of the forests.

In 1872 Mr. Puckle, the Collector of Tinnevelli, received charge of the forests, and immediately adopted effective measures for their preservation. It was first necessary to provide for all the reasonable wants of the villagers dwelling at the foot of the hills, as regards grazing and firewood cutting. For this purpose numerous tracts were allotted on the spurs and hill sides, entry into the forests above being prohibited, and the system of felling on license being abandoned. Thus the forest officers can now control the felling, while the tracts in which the rivers rise are strictly protected. One important duty to the people will thus be efficiently fulfilled. For there can be no more short-sighted policy than to allow the villagers to waste and destroy forests on the preservation of which not only the prosperity but the very existence of the population of a whole district may be involved. It is perfectly true that the forests are the property of the people; but for the very reason that they are the property of the whole people, and not of the few villagers and wanderers who happen to live in or near them, it is right and just that they should be preserved and protected from waste and destruction.

It will, perhaps, be interesting to examine, briefly, the system by which the water, the supply of which is thus secured by the conservancy of the forests, is utilized when it reaches the plain. The drainage area of the Tamraparni is 200 square miles. In the forest where the river rises the rainfall is between 200 and 300 inches, in the plains near the foot of the hills it is 30 inches, and nearer the mouth of the river only from 18 to 20 inches a year. The course is for about 20 miles in the forest-covered mountains, and 70 in the plains.

The Tamraparni flows in a rapid current for about 11 miles, and then drops over a fall of 100 feet. Thence, by minor falls, the river descends 200 feet in 4½ miles to the Vanathirtam Cataract, which is 150 feet high; and, finally, it drops over the Paupanasam barrier, about 250 feet, into a basin. The tributary Chittar descends to the plain by a picturesque waterfall at Kurtallum; and these cataracts are considered sacred, and are believed to wash away original sin. Hither the ancient kings went to enjoy the summer, pavilions and pagodas were erected, and pilgrims crowded to the holy sites. When the English occupied the district, in 1800, they were attracted by the renowned beauties of the falls, and, through the persevering efforts of Mr. Casamajor, in 1801, a garden was formed at Kurtallum, containing coffee, nutmegs, and other spice trees. The lovely scenery, at Paupanasam and Kurtallum, has been rendered familiar through the labours of Thomas Daniell, whose drawings, made during the last decade of the last century in almost all parts of India, were executed with such care and accuracy as to bear the test of comparison with recent photographs.

After passing the falls, the rivers leave the moist forests with their 200 inches of rain every year, and enter upon the eastern plain. The climates of the east and west coasts are entirely different, and while, in June and July, they are reaping in Travankur, in Tinnevelli they are preparing the soil. On the Tinnevelli side the scanty rains from the N.E. monsoon commence in the middle of October, and last until December. For the rest of the year the heat is excessive, and from February to June all nature is parched up. The S.W. monsoon on the opposite

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coast supplies occasional showers, and cloudy weather in the districts near the foot of the hills; but nearer the sea there is no such relief.

Into this dry and thirsty land the rivers bring the life-giving water obtained from the other coast; and the people have put it to good use. The system of irrigation is entirely of native origin, and some of the works are of great antiquity. They consist of dams or *anicuts* placed across the rivers to raise the water to a level with the land, and of channels on either bank, to carry it to the fields. There are seven *anicuts* on the Tamraparni, four on its tributary the Chittar, and two on the Mannemutu-ar. The first dam across the Tamraparni, called the Thalay *anicut*, is at Paupanasam, just below the falls, and consists of stakes and brushwood, renewed every year, whence a channel is led off on either bank, the north one 10 and the south one 6 miles long, both ending in tanks. Six miles lower down is the Nathianni *anicut*, a very ancient structure, consisting of large blocks of stone, placed obliquely across the river, and 468 feet long. Only one channel flows from it for 12 miles, on the north bank, which irrigates 1119 acres, yielding 129*l.* of revenue. A mile and a half below the Nathianni is the grand Kannadian *anicut*, built of cut stone, 9 feet high, with a top width of 6 feet, and a large rough apron, varying in width from 35 to 160 feet. The *anicut* is divided into two by a rocky island, and a noble channel is taken from it on the south side, which is 22 miles long, and irrigates 9574 acres, yielding 17,981*l.* of revenue. The Kannadian channel flows through the town of Seran-mahadevi, 9 miles west of Tinnevelli, and between it and the river the country is one sheet of rice, interspersed with groves of palmyra palms. Six miles below the Kannadian *anicut* is that of *Kodagun*, 2287 feet long, built of cut stone, but roughly put together. It provides for one channel on the north side, 10 miles long, which irrigates 5433 acres, yielding a revenue of 6106*l.* The Palavur *anicut*, two miles east of the town of Seran-Mahadevi, is 2532 feet long, and a channel flows from it, on the south side, for 26 miles, supplying 54 tanks, and terminating below the town of Palamcottah. It irrigates 2865 acres, which yield 5468*l.* of revenue. A mile and a half below Palavur is the Suttamelli *anicut*, divided by a rock into two portions. A large breach in it, caused by freshes in the river, was repaired in 1855. The channel from it, on the north side, is 14 miles long, and then forks into two streams flowing through the city of Tinnevelli, called Suttamelli and Aruapuram. The former channel bears a name which means "pure woman," from the tradition of a wrongfully accused queen having proved her innocence on its banks by the fire ordeal. These artificial streams irrigate 1806 acres, yielding 3299*l.* of revenue, and the city of Tinnevelli, with its great and wealthy temple, built, as Mr. Fergusson tells us, almost exactly on the plan of Herod's temple at Jerusalem, lies in a setting of brilliant verdure. It was on the irrigated land of these channels that, upwards of sixty years ago, Mr. Hughes formed his indigo and senna farm, and gardens and other rich cultivation still line their banks. The largest *anicut* of native construction is 18 miles below that of Suttamelli, and 27 from the sea. This is the *Murdur*, of curious horseshoe shape, with the curve up the river, 4028 feet long, and supplying a channel on either side. At the head of the south channel there is a large *calingulah*, or escape weir, of beautifully cut stone-work. These channels run in and out of several large tanks, and irrigate 14,400 acres, yielding a revenue of 17,700*l.* Below the Murdur *anicut* there are four channels, irrigating 4280 acres of land, which yield 498o*l.* of revenue.

Such is the native system of irrigation from the Tamraparni, which supplies 39,578 acres, yielding a revenue of 56,828*l.* They might, doubtless, be improved and extended, but as they are they serve a great purpose, and have done so for centuries. Our simple duty, which has not always been very efficiently attended to in the years that are gone, is to keep the works in thorough repair. It appears that the repairs have only cost 1½ per cent. on the revenue.

In spite of the water taken off by the seven *anicuts* and channels for irrigation, a large surplus went to the sea, which might also be made to do its share in fertilizing the land. It was to utilize this surplus that the construction of another *anicut* was proposed at Striviguntum, 12 miles below Murdur, where the minimum discharge is 198 cubic feet per second in the driest month. For six months the discharge is 79,000 cubic yards per hour, which is sufficient to irrigate 39,000 acres at the rate of 2 cubic yards per acre per hour. The Striviguntum project was originally designed by Colonel Horsley, in 1855. It was matured, in 1868, by Captain Prendergast and Lieutenant Shepherd. The *anicut* is to be 1380 feet long by 6 high and 7½ broad at the crown. The foundations are on wells; on either side there is to be a head sluice to regulate the supply, and under sluices. The work is designed to irrigate 32,000 acres, 15,000 on the north, and 5000 on the south side. The people took so great an interest in the work that they voluntarily subscribed Rs. 20,000 towards it, and its construction was sanctioned in 1869 at a cost of 83,160*l.* Good progress has since been made; and, as 76,878*l.* had been expended up to the year 1873, it may be presumed that the work is approaching completion.

The comparative density of population is one test of the dependence of the well-being of the people on these irrigation works. The most populous taluk, or district, in the Tinnevelli Collectorate is that of Ambasamudrum, through which the Upper Tamraparni flows, and where the Kannadian and other channels convert the country into one sheet of verdure. Here there are 539 souls to the square mile. The Tinnevelli taluk has 504, and the Tenkasi, watered by the Chittar River, 514; while the Attapidaram taluk to the eastward, where there is no irrigation from rivers, only has 258 souls to the square mile. The average number throughout the Tinnevelli Collectorate is 327 to the square mile. This is about the same density as in Trichinopalli, South Arcot, and Malabar; while Tanjore, which is one sheet of irrigated land, has 600; and the other districts of the Madras Presidency have only from 100 to 200 inhabitants to the square mile. The amount of irrigation is an exact gauge of the density as well as of the prosperity of the people.

Tinnevelli, with its 1,693,959 souls and 403,803 houses, is a wealthy and prosperous district, owing to the geological accident that the rivers plunge over the Kurtallum and Paupanasam falls, instead of being diverted to the westward by a barrier ridge, as is the

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case with the Periyâr in the Madura district. Hence, in addition to its 884,566 acres of dry grain crops, including cotton, there are 208,660 acres of irrigated land, making a total of 1,093,226 cultivated acres, yielding a land revenue of 285,655*l.* Tinnevelli, besides the coffee and spices in the hills, and the rice crops on the irrigated tracts, is one of the four principal cotton districts in the Madras Presidency, the average cultivation of that staple covering about 190,000 acres.

In Madura and Tinnevelli there are two contiguous districts with the same climate and rainfall, and the same soils; but in Madura there is no such expanse of fertility as may be seen from the summit of one of the gopurams of the Tinnevelli temple. And this difference depends upon whether the moisture contained in the clouds which are driven across the Indian Ocean upon the western faces of the ghauts, is diverted, when condensed, to the right hand or to the left. On this apparent accident rests the question of wealth or indigence for vast tracts of country. As regards Madura the barrier ridge diverts the water to the westward; and here the agency of man should step in, and cut a way for the life-giving element into the eastern plain. For Tinnevelli nature has herself done the needful work, and the beneficent floods pour over the sacred falls at Kurtallum and Paupanasam. Here the duties of the rulers of the land are simpler and less arduous. These duties are to protect the forests which regulate the supply, to keep the ancient irrigation works in thorough repair, and to utilize the surplus water escaping to the sea, by constructing supplementary works. All these measures have been, or are being taken; and Tinnevelli, with its busy port of Tuticorin, is among the most flourishing districts of British India.

C. R. M.

"FROM CHINA TO PERU."*

THE EMIGRATION QUESTION.

IT has often been conjectured that the first settlers in South America, the men who founded the byegone civilisations of the Toltecs, the Chibchas, and the Yncas, made their way across the Pacific from the eastern empires of Asia to the shores of Peru. Many centuries have passed away, and once more the stream is setting in the old direction, in order that the waste places of the new world may again be peopled, and better homes may be provided for the overcrowded labourers in the teeming east. Such tendencies cannot be stopped. It is the part of true statesmanship, not to hinder the inevitable course of events by interposing obstacles, but to guide and direct it by wise provisions and watchful superintendence.

Three centuries ago the Empire of the Yncas contained an ample population; which was thinned down to its present condition by the colonial policy of Spain. Tier upon tier of terraced cultivation once lined the now desolate alpine slopes, and a civilized race, long since utterly extirpated, peopled the fertile valleys of the coast. The system of *mitas* or forced labour in the mines, manufactories, and farms, depopulated the country of the Andes, and on the coast a whole race was swept away and partially replaced by imported negro slaves. The policy of which this was the result had always been opposed to the feelings and interests of the people of the country, and when the independence of Peru was proclaimed in 1821, one of the first acts of the young Republic was the adoption of a scheme for the gradual emancipation of the slaves; long before such a measure was seriously considered in the English Parliament. The emancipation, which was wisely effected by progressive stages, was made complete in 1855, when the proprietors received a compensation of $300 for each slave. The condition of the Indians was also improved by the expulsion of the Spaniards, and the declaration of independence in Peru. The *mita* or forced labour was entirely abolished in 1825; and in 1854 the *tributo* was also put an end to, a tax which was the equivalent to the land tax in British India. The modern Peruvians have indeed set a noble example as regards the treatment of the labouring classes, both in legislation and in practice; and the burning indignation felt and expressed by Colonel Espinosa, in his noble work *El Diccionario para el Pueblo*, whenever he treats of slavery or forced labour, is fully shared by a large proportion of his countrymen.

The landed proprietors of the coast and *sierra* of Peru are, as a class, most kindly and considerate employers of labour. The present writer has travelled for hundreds of miles along the coast and over the Andes, sojourning at the cotton, vine, and sugar estates in the different valleys, and he gladly bears his testimony to what he saw. The negroes were a happy and contented race, endeared to their masters by the traditions and the experience of kind and considerate treatment. In these Peruvian *haciendas* one is aroused by the voices of girls and women, who all repair to the door of the chapel, and chant a hymn of praise upon their knees. This is repeated at sunset, when the hours of labour are concluded. The days of work are varied by *fiestas*, and the people are well fed and housed within the spacious *galpones*. The Chinese labourers have, it is true, introduced a disturbing element, and the want of women among them is a deplorable aggravation of the position. But the state of things is gradually improving, while the additional labour is extending cultivation and enriching the country. For the proprietors of estates in Peru are an excellent class of country gentlemen, and habitually considerate in the treatment of their dependents. Such men as the Count of Monte Blanco, the Count of Torres de Oran, Don Mariano de Osma, Don Pedro Paz Soldan, Don Manuel Quintana, and a host of others of similar stamp, are not to be spoken of in the same breath with ordinary planters and speculators, whether English or American. Peruvian *hacendados*, such as those I have mentioned, have received their estates from their forefathers, and are not planting adventurers merely seeking to make money rapidly. There is another class of proprietors and renters who have more recently acquired estates, such as Mr. Henry Meiggs, Mr. Reid, Mr. Swayne, and Don Antonio Ramos, and they are also upright and humane landlords, as a rule. Among the great employers of Chinese labour in Peru, the name of Henry Meiggs may be specially mentioned. He pays many of his

* *Memoria que el Ministro de Estado en el despacho de Relaciones Exteriores presenta al Congreso Ordinario de* 1874. (Lima, 1874.)

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labourers largely in excess of the wages stipulated in contracts, as an incentive to peaceful industry, or as the reward of it.

The emancipation of the slaves, and the extension of cultivation gave rise to a very urgent demand for labour on the Peruvian coast estates, and in November 1849 the Chinese labourers began to arrive. The immigration was at first encouraged by the Peruvian Congress, and $30 was paid for each man. This system of giving bonuses was revoked in 1853. Between 1850 and 1853, 2516 coolies were landed in Peru; and from 1860 to 1872 the number increased to 80,458. The misfortune, in the conveyance of the coolies from China to Peru, was that the business fell into the hands of private speculators, whose sole object was to make money out of the traffic. Agents and brokers, for enlisting coolies, established themselves at Macáu, and there was much kidnapping, over-crowding, and ill-treatment. But these evils have been grossly exaggerated. They were the inevitable consequences of allowing arrangements for a system of emigration on a large scale to fall into private and irresponsible hands. This is what has almost always happened when the demand for labour first arises, and the same irregularities and abuses have occurred in the beginnings of colonization by all other countries. It is, therefore, stupidly unjust to impute to Peru and the Peruvian people the evils of a system which has ceased to exist, and which the Peruvian Government has always endeavoured to prevent. Far worse atrocities than the Peruvians have ever been accused of, have, under a similar system, been habitually committed in recent times by natives of Britain; and the countrymen of the ruffians who owned the notorious schooner 'Carl,' should remember that a bad system is not peculiar to Peru.

The system of emigration from China to Peru was never, in the worst times, so bad as that introduced by British subjects between the New Hebrides and Salomon Islands and some British settlements. The ships taking coolies from Macáu to Callao may be divided into two classes—first, those belonging to the emigration companies established at Lima, and second, those which were hired. The first class consist of large well-found vessels, with 6½ feet between decks, and sufficient space for each emigrant. These ships are well ventilated, and there is provision for medical attendance. The 'Isabel,' 'America,' 'Camilo Cavour,' 'Fray Rentos,' and 'Rosalla,' are good of their class; and Messrs. Samuda have recently built a steamer on purpose for this traffic, in which hygiene and ventilation have been especially studied. The rations for each cooly are sufficient, and include rice, *frijoles*, preserved vegetables, and fish, tea, and tobacco. The vessels of the second class, which are generally French, and are hired for the voyage, are not so good, and it is on board these that the abuses and cases of neglect, which have been so much talked of, and so seldom proved, have occurred, or are alleged to have occurred.

It is then to a system which has prevailed, and has led to excesses among Englishmen, quite as much as among Peruvians, that the evils are due, and not to any nationality—namely, the system of allowing arrangements for emigration to fall into private hands. This system has now ceased to exist as far as Peru is concerned, and all just reason for discouraging emigration to that country has ceased with it. But even while the Chinese immigrants were brought to Peru through this objectionable agency, the Government of that country has steadily endeavoured, by legislation and negotiation, to correct the evil. In February 1872, a Consular Convention was entered into with the Portuguese Government to prevent abuses at Macáu, and the Peruvian Executive, in their anxiety to remove all just cause of complaint, empowered the representative of Portugal to take diplomatic charge of the interests of the Chinese in Peru. But, as we explained in our previous number (p. 343), the Government of Portugal afterwards abolished contract emigration of Chinese colonists through the port of Macáu altogether, from the end of March 1874. This wise and enlightened measure must finally put a stop to all the irregularities and cruelties that have been complained of, by suppressing the illicit kidnapping and overcrowding, which are the natural consequences of a system of private speculation through irresponsible agents or brokers. It will necessitate the establishment of direct emigration from China, under government superintendence, and on fixed conditions formally arranged by treaty. While on one side of the Pacific the Portuguese authorities have taken this decisive step to put a stop to irregularities and abuses in the shipment of emigrants, the Peruvian Government has been equally mindful of the interests of the imported labourers on the other. By a decree, dated October 14, 1873, it was enacted by the Congress of Peru that there should be a department, in the office of the Prefecture of Callao, to register all contracts, and to enforce their exact fulfilment. Two Asiatics, as agents of police and interpreters, are to be attached to this department, which will be in correspondence with the sub-prefecture of every province in which contract emigrants are employed. On the day after the arrival of an emigrant ship at Callao, the agents are bound to submit a list of the emigrants, with the estate to which each is to go, the date of contract, the day on which it terminates, and the nature of the work on which each will be employed. Copies of these registers are to be sent to the sub-prefects of the respective provinces. At the expiration of a contract the master is bound to report that the emigrant is free, at the office of the sub-prefect of his province, on pain of a fine of 100 *soles*, and, if the emigrant desires to return to his own country, the introducer is bound to find him a free passage.

Thus the most sincere and effective endeavours have been made, by the Peruvian authorities, to ensure justice and liberal treatment to immigrant labourers; and it was also determined to take similar steps with reference to their engagement and passage, by direct negotiations with the Chinese Government. At this juncture, in 1872, an event occurred which rendered the despatch of a Peruvian Mission to Japan indispensable, and advantage was taken of it to negotiate treaties with both the great powers of Eastern Asia. A vessel of 600 tons, called the 'Maria Luz,' commanded by a Captain Herrera, had sailed from Macáu with 225 emigrants on board, and put into the Japanese port of Yokohama from stress of weather in July 1872. It appears that, during the night of July the 13th, one of the emigrants swam to H.M.S. 'Iron Duke,' and it was somewhat gratuitously assumed and reported to the Japanese authorities that there was ill-

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treatment on board the emigrant ship. The result was that the Peruvian captain was tried, and sentenced to receive 100 lashes, though a pardon was granted: all the emigrants were taken out of the ship, and the owners were subjected to heavy losses. This extraordinary proceeding was reported to the Peruvian Government, and the President, Don Manuel Pardo, resolved to despatch an embassy to demand reparation for the outrage, and at the same time to establish treaty relations with Japan and China.

Don Aurelio Garcia y Garcia, a captain in the Peruvian Navy, was selected for this important mission, and the instructions for his guidance were embodied in a very able State Paper by the Peruvian Minister of Foreign Affairs, Don J. de la Riva Agüero, dated December the 3rd, 1872. Commercial relations, it is stated, have long existed between Peru and Eastern Asia, and even in Spanish colonial times maritime expeditions frequently sailed from Callao and other Peruvian ports to the Philippine Islands. Since 1845 there has been direct trade with China, and since 1849 those Chinese labourers have annually arrived, without whose aid the progress of agriculture in Peru would have been impossible. After referring to the abuses of the cooly traffic, the instructions dwell upon the importance of establishing relations with China on a definite and permanent basis. The points which the envoy was to secure and to undertake were, freedom for Chinese subjects to emigrate, guarantees of good treatment during the passage, and strict fulfilment of contracts. He was to propose the adoption of the rules which were agreed to between England and China in March 1866, and promulgated as imperial laws in 1868; and he was desired to make the spirit of these laws the basis of his negotiations. The Government of Peru, he was reminded, far from approving of any previous outrages and irregularities, is animated by an earnest desire to enforce the same regulations as have been adopted by the English Government, and he was instructed to invite China to send special commissioners to Peru to watch over the exact fulfilment of all contracts. The Envoy was also to negotiate a treaty with Japan, and to investigate the affair of the 'Maria Luz.'

Señor Garcia y Garcia arrived at Yokohama on February the 27th, 1873, and, after a friendly reception, he opened his commission by recapitulating all the particulars of the 'Maria Luz' outrage, and demanding reparation. In a long and erudite reply the Japanese Minister quoted the authority of numerous publicists, and endeavoured to establish a distinction between foreign ships and their passengers. After some further fencing, the question was settled on June the 19th 1873, both parties agreeing to submit it for arbitration to the Emperor of Russia, and a protocol was drawn up and recorded to that effect. Negotiations were then opened for a treaty of friendship and commerce between Japan and Peru, which was signed on August the 21st 1873, Peru obtaining all the privileges of the most favoured nations, including freedom of emigration.

The Peruvian Envoy then proceeded to China, and reached Tientsin on October the 31st 1873, where he opened negotiations with Prince Kung through the Viceroy of Chihli. Here Señor Garcia y Garcia met with difficulties which appear to have taxed all his diplomatic abilities to overcome. The Chinese authorities had received false and exaggerated accounts of the condition of their compatriots in Peru. Some of them, it was said, had sent petitions in which they complained of being insulted, overworked, and ill-used; while the emigrant ships were overcrowded and ill-found. This Chinese despatch concludes with the preposterous demand that the whole of the emigrants in Peru should be reshipped to China. In a very able and detailed reply, the Peruvian Envoy stated that compliance with such a demand was out of the question, for that the Chinese in Peru, when their contracts were at an end, became citizens of the country of their adoption, and that many of them had acquired wealth, and could not be forcibly removed from a free country. He added that such a proceeding could only be com ared with the barbarous expatriation of the Moriscos from Spain by Philip III. He then explained the regulations that had been made for the proper treatment of the emigrants, on the voyage, and in Peru. Señor Garcia y Garcia appears to have caused a favourable impression by this rejoinder, for he was invited to Peking on the 21st of December 1873, and, after much discussion, a treaty of friendship and commerce was signed between China and Peru on the 26th of June 1874. Señor Garcia y Garcia has conducted these difficult negotiations, requiring much tact, judgment, and patience, with distinguished ability, and most complete success.

By the new Treaty between China and Peru free emigration is allowed under certain regulations, and a line of steamers will probably convey emigrants, under strict government supervision. It is also provided by a Special Note signed on the same day, that a Chinese commission shall visit Peru, in order to inspect and report upon the condition and prospects of the emigrants. The Peruvian Government agrees to give the Members of the Commission the fullest assistance in the fulfilment of their duties, to compel employers to provide passages home to time-expired Chinese labourers, and to place all Chinese subjects on the same footing, in every respect, as those of the most favoured nation. A sort of *avant courier*, in the shape of a confidential agent, arrived at Lima last September. He will visit the principal estates along the coast, and prepare the ground for the official Chinese Commission shortly to arrive in Peru, according to the provisions of the Treaty. The emigrants, instead of being the scum of Southern China, will now come from the northern provinces, and will be a far superior class. A line of screw steamers, with a guarantee from the Peruvian Government, will probably be established to convey them, and the accommodation and provisions will be strictly regulated and inspected by official agents.

The Chinese Commissioners will find their compatriots in Peru in a far more contented and prosperous condition than has usually been represented, and it is understood that the Agent, who has already arrived, has actually received very favourable impressions. Many of the Chinese, who have served out the terms of their indentures, are engaged in business or have become domestic servants, and there are even two prosperous firms in Lima composed of Chinamen, who receive large consignments. There is a Chinese club, a Chinese theatre, and a Chinese benevolent society in Lima and Callao; and altogether these

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people are making their way in the land of the Yncas, where their prospects are certainly better than in the British and French West Indian colonies. Nor are they ungrateful to the Peruvian authorities, under whose protection they have thriven. On the 2nd of last August a number of Chinamen, in the name of the numerous colony of their compatriots, settled in Peru, presented an address to Don Manuel Pardo, the President of the Republic, on occasion of the completion of the second year of his term of office. They allude to the guarantees and equal rights which have been secured to them, and to the protection they have received; and warmly express their gratitude to his Excellency's Government.

This address of the Chinese emigrants in Peru is a sufficient reply to the misrepresentations of the Aborigines Protection Society, which have recently been published.

The abolition of the contract emigration of Chinamen from Macáu by the Portuguese Government, and the provisions of the new Treaty between China and Peru, will place emigration between the two countries on a thoroughly healthy and satisfactory footing. The essential point is that emigration should be watched and regulated, in every stage, by the respective Governments. All grounds for complaint are now removed; and the Peruvian Envoy in this country is able, in preferring a request to the British Government that emigration may also be permitted between India and Peru, to undertake that all the provisions for the protection of emigrants, which are contained in the conventions with France and Holland, will be scrupulously observed by Peru, if a similar convention is agreed to between Great Britain and that Republic.

Several natives of Hindustan, after serving their contract time in British or French West Indian colonies, have found their way to Callao and Lima, and are well satisfied with their reception. Their success will probably attract others; and there can be no doubt that, in the warm valleys of the Peruvian coast and in the montañas of Chanchamayu, the natives of the over-crowded districts in Bengal and Madras would find a climate and employment well-suited to their constitutions, and considerate masters in the proprietors of the *haciendas*. If emigration is to be encouraged in India, the surplus population will find no better country in which to seek new and more healthy homes than the land of the Yncas. The Peruvian Republic has always scrupulously fulfilled its financial obligations, and her Government has consistently and at last successfully sought to introduce a humane system of emigration. Under the presidency of a statesman such as Don Manuel Pardo there is every guarantee that the provisions of treaties and conventions that may be entered into, will be fulfilled to the letter, and that emigrants, while once more restoring wealth and prosperity to the glorious land of the children of the Sun, will find for themselves a cordial welcome and improved conditions of life.

CLEMENTS R. MARKHAM.

THE NEW GUANO DEPOSITS OF PERU.

IN our numbers for April 1874, p. 35, and June 1874, p. 121, we announced the discovery of large deposits of valuable guano on the southern coast of Peru. This great source of wealth has been thoroughly examined, in the course of the present year, by two civil engineers employed by the Peruvian Government, MM. Thierry and Hindle, as well as by Commander Cookson of H. M. S. 'Petrel'; and the guano has been analyzed by Don Antonio Raimondi, the eminent Peruvian chemist, as well as by Professor A. Voelcker on the part of the Royal Agricultural Society. The results have more than fulfilled the most sanguine expectations.

The first important deposit, commencing from the south, is on the north point of the table-land which extends to the river Loa, forming the boundary between Peru and Bolivia, and only a few miles from that stream. The place is called Chipana, and is in latitude 21° 23′ S., and longitude 70° 19′ W. The surface is smooth, and covered with a slight layer of sand, under which is a hard salty crust overlying the guano. The quantity is estimated at 89,439 cubic metres. Next comes the deposit at Huanillos, an elevated cliff in latitude 21° 15′ S. and longitude 70° 8′ W., which Captain Cookson estimates at 900,000 tons. Pabellon de Pica is an immense cone, rising out of the sea to a height of 1000 feet, with its slopes formed by guano deposits. It is in latitude 20° 58′ S. The quantity here is estimated by the same officer at 4,500,000 tons. Thus, the three newly-discovered deposits of Huanillos, Punta de Lobos, and Pabellon de Pica, in the province of Tarapaca, consist of 7,400,000 tons of guano of good quality. Señor Raimondi, in his analysis, reports the Tarapaca guano to be powdery, very dry, and superior to the Chincha guano, owing to the quantity of ammonia it contains, combined with a larger proportion of soluble phosphoric acid. Professor Voelcker also found the sample to contain nitric acid.

The great deposits on the Chincha Islands, which were used by the coast agriculturalists in the time of the Yncas, are now nearly exhausted. They have been worked for the European markets since 1846. In 1851 the amount of shipping which loaded at the Chinchas represented a tonnage of 191,000; from 1851 to 1860 it was 2,860,000, and the yearly mean during that period was 286,000 tons. Between 1853 and 1872 there were 8,000,000 tons shipped from the north and middle islands. The Chincha Islands ceased to be worked for export to foreign countries in 1872, and now only Peruvian vessels load guano for use in Peru, at the northern island, where there are still believed to be 150,000 tons. In 1873 the north island was visited by 35 Peruvian vessels, which shipped 11,634 tons. The population of the three islands was 6000 in 1868. In 1874 there are 105 persons on the north island, and none on the others.

The exportation of nitrate of soda from the ports of the province of Tarapaca is increasing every year, and forms another great source of Peruvian wealth. In 1830 the quantity exported was 18,700 *quintals* (a *quintal* = 100lbs.); in 1840 it was 227,362 *quintals*; in 1850 it was 511,845; in 1860, 1,370,248; in 1870, 2,943,413; in 1873, 5,768,741; and the whole quantity exported from 1830 to 1873 has been 50,173,729 *quintals*.*

* See *Ocean Highways*, December 1873, p. 385.

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The value of the newly-discovered guano, apart from the great saltpetre deposits, is enormous. The 7,400,000 tons, at the moderate price of 7*l.* 10*s.* a ton, are worth 55,500,000*l.* The national debt of Peru amounts to 35,000,000*l.*, so that the guano alone is a solid guarantee to the public creditors for more than the sum total of the whole debt, a guarantee such as no other State which has raised a loan in the European money markets, has ever offered before. Peru has punctually met her engagements during a period of 30 years, and her credit deserves to stand high, both on account of her probity and of her extraordinary resources.

SIGN-POSTS ON OCEAN'S HIGHWAY.

THE BIRTH OF DUST.

CHAPTER II.

"He hath founded it upon the seas, and prepared it upon the floods."

"Let the waters under the heaven be gathered into one place, and let the dry land appear, and it was so."

WE head this chapter with those words, not only because they belong to the Bible, upon which so many of us Dusts love to rest, but because in the course of a reasonable long life, and a tolerable acquaintance with the works of nature and the books of man, we have never met words which harmonize so well with the actual results of the great cosmical laws, or which convey so clearly to the mind the forces, their actions, and the materials that must have been employed, surely but slowly, preparing for the birth of dust. The long-expected event excited much attention; a great deal depended on it; all the elements were required to attend, all were obedient to the requisition; Old Time, with his virgin scythe, superintended the preparations of the whole.

We have said, and we repeat it, that the dusts have nothing to do with the beginning. Solomon told us it was "unsearchable." Professor Tyndall, the latest authority on the subject, told the British Association at Belfast, that "all we see around us, and all we feel within us, the phenomena of physical nature, as well as those of the human mind, have their unsearchable roots in a cosmical life." We hope to comprehend some of the so-called phenomena of nature; but the root must remain incomprehensible. Look where we will, think how we may, both senses find the horizon utterly undefinable. The deepest science of the present is no nearer the mark than Solomon was.

It is far within the limit of that horizon that we look for the birth of our ancestor. Long previous to that event heaven and earth were created; the waters were divided by the firmament. Light and darkness made the day and night. The second day, that comprehensible measure of incomprehensible time, had passed away; two measures of eternity had run out; all that was done in those measures was done by law. Those laws gave direct proof of supremacy; they were infallible; they have continued from eternity till now. The three elements affected by the laws—earth, air, water—were from the beginning; each of them was composed of, and divisable into, many parts; each part, and the whole, were amenable to the laws. The heavens around these elements, with all the hosts of suns, and moons, and stars, all moving, all at vast distances from one another, all occupying infinite space, were and are subservient to these laws; each performs his duty, each fills his cycle, all are under one control, the Creator, our God, the "great first cause," so little understood.

As the winds and the waters move now under the influence of cosmical laws, so must they have moved from their beginning; as the earth submits to their forces now, so must it have done from the time they began to move. The earth allows the permeation of air and water, while the latter compresses it; and air compresses both in its never-ending embrace of love, of light, and of vitality.

Under the united influence of the three elements, the preparations were progressing beneath the floods; the foundations were at the bottom of the waters. In the third day of God's eternity "the waters under heaven were gathered into one place, and the dry land appeared"; at that moment this great cosmical mother produced little dust.

Looking at ourselves to-day, we know that we come from something; something, therefore, existed before us. What that something was is of no consequence just now; we will claim our heritage presently. We must consider the manner of the birth, the locality does not concern us.

We see that atoms, or molecules, as some delight to call them, settle down in quiet places from a dance in the sunbeam. Before the sunbeam days, we danced in the light; as long as the air sustains us in motion we dance. When the air is still, we rest according to our varied conditions. At this present moment we see ourselves on the table, the books, and the ink-stand; if we were not carefully removed daily, we should soon bury them, as we buried Tyre and Sidon. As the air moves, carries, and disposes of dust, water may do the same; but the atom, or molecule, which is capable of forming dust out of water, has to change its condition before taking its place in our family circle; so that we must look at it first in its damp condition, in combination with the forces to which it is liable.

We presume that the first water rested on earth. When the waters were moved, the bed was eroded: the atoms so eroded were as liable to the forces of the water, as dusts were to the forces of the air. They were moved along as drifts; they were carried off in suspension or borne along in solution, they subsided in quiet places, they sunk under the law of gravitation, they stopped for want of force to move them, or some obstacle prevented further progress. We can see similar actions going on in our seas and our atmosphere to-day. As our drifts, our mud, and sand-banks grow now, so they must have grown from the moment that the waters moved away matter from their bed.

Vast regions of the ocean bed are now disclosed to us by the elaborate reports of Captain Nares, of H.M.S. 'Challenger.' He finds that "the rocky nature of the bottom indicates a considerable movement of the lower stratum of water." In one place "the sounding-rod was filled with decomposed rock," which was evidence of the process of erosion. Red coral was found, at a depth of 80 fathoms, in the Atlantic, with a temperature of 52°, the same as on the coral beds of the Mediterranean. These growths

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indicate a comparatively quiet sea. Coral mud was found at a depth of 2450 fathoms, telling of erosion and removal. Diatom and globerigina ooze-beds were found at great depths, proving a sinking by gravitation; clay and mud, of varied sorts, at varied depths, proved long-continued trituration of soft materials. Sand, gravel, stones, and rock, found at smaller depths, all indicated currents of varied forces, all laden with materials of varied sorts. The dredge showed that occasionally various deposits were going on at the same time, due to change in the force of currents, or to changes in the material liable to the currents. We have thus the most satisfactory confirmation of constant motion in the waters, constant erosion of their bed, and constant removal of matter from one place to another.

We are bound to take another view of these actions for the purpose of discovering, as far as we are able to do so, the nature or condition of the atoms liable to them. There was a time when the movements or the circulations of the water were without control; when there was no dry land to bid the waves "be still," when the currents met with no interruption, except from the inequalities of their own beds, inequalities which they had made. It is of no consequence here whether the circulation was caused by the varied gravity of the waters, by the expansion of the warm, by the contraction of the cold, by the influence of the winds, or by cosmical motion; we know the circulation exists now, and we may safely assume that there were currents that had a free passage from the equator to the poles, and from the poles to the equator.

On what material did these cosmical forces work? Man has divided what he knows of the strata in the earth into systems, groups, and epochs. The last epoch called the azoic, or lifeless, contains the group of gneissic and granitoid schists, under the so-called metamorphic system. These schists are found in stratified condition as water sediments, on the tops of the highest mountains, on the level earth, and at the lowest depths to which man has explored. There is no reason why these schists should not have been deposited at or about the same time; it is of no consequence to our history whether life did or did not exist in that epoch; but the errors of teachers of geology are of some consequence. Mr. Page tells our schools in his Text-book, "we see clearly that a change has taken place in the original sedimentary character of the strata, and that which at first consisted of water-worn débris—as silt, clay, and sand—has now been converted into a hard shining and crystalline rock." The conversion is supposed to have been brought about by heat. It did not strike Mr. Page that silt and clay belong to epochs of vegetation, and life, so that they need not have been expected in his azoic formations; while azoic times must of necessity have produced hard shining crystalline unfossiliferous rocks, in which the only change that has taken place to our knowledge is the natural change similar to that which takes place in chalk and silicious loam deposits; in these the silex leaves the loam and chalk, forming silicious nodules. In the harder rocks this silicious matter runs into lines, masses, and crystals; no heat is required for these changes, they are inevitable where liquid silex exists. As no human being ever saw these rocks in any other state than they now are, we reject the word metamorphic as fabulous, and go on with our history.

Here and there on the earth's face we find these silicious schists; on our sea and river shores we find sand in all conditions of purity and impurity. In all conditions sands are the remnants of the hard silicious rocks, no other material forms into pure sand, no other material is so indestructible. It is generally allowed that these schists are "primary" formations; if they are, they formed the old water-bed, and hence the erosions from that bed, when redeposited by water, assume a sedimentary character very similar to their parents. If our schists are not primary, we may place them in the second place, as triturated remains of the primary silicious water-bed. It is to this water-bed that we look to, as giving up the atoms required to build banks and shallows in those lifeless days; for as these spots are formed now they must have been formed then. Looking at their tolerably pure condition, we see that there was little else to make them of, except that pure water-bed from whence fragments must have been broken off. They must have undergone trituration, and rolling up the vast slopes of the uncurbed water's bottom, they must have been worn into the very condition in which we find them—hard grains in a hard shining rock.

So far then we have prepared the foundation for the birthplace; the purest material was sent to the front by the urgent currents and never-resting waves; countless numbers of minute atoms rolled along, every moment becoming more and more, finer and finer; while still behind them fresh materials were handed on; the shallow places were getting shallower, the deep places were getting deeper; and we approach a subject of which no reasonable explanation has yet been given. How were the waters gathered into one place, and why did the dry land appear?

When we look at and understand the results of natural laws we find them so beautiful, so harmonious, all tending to one end, that as parts and parcels of those results we cannot but glory in the supreme prescience, which created the beginnings of those laws, under which such great events occur. The birth of dust is too momentous an occasion to enter here into arguments with man. We are contemplating this globe as a cosmical mass, composed of three elements, forming a wondrous trinity, uniting in all its parts in obedience to those laws, under which each part came into existence, their incomprehensible beginning. To enable us to comprehend the law that we allude to, to watch the obedience of each element, and see the results, we use a simple diagram (see next page), as a comprehensible measure of actions, going over incomprehensible time, and extending over cosmical space. It shows us the present level of the surface ocean at O—the present depth of the ocean between 5 and 6 below, and the present height of the mountains, between 5 and 6 miles above the ocean level. These are all the points we refer to at present, but they will be referred to again.

There are two ships engaged at this moment in examining ocean depths—the 'Challenger' from England, and the 'Tuscarora' from America. Commander George E. Belknap, of the latter, reports under date June 26th, Japan, (the *Times*, 2nd September, 1874):—"When about 100 miles east by south from Kiraghassan, or Sendai Bay, on the east coast of Japan, the lead sank to a depth of 3427 fathoms,

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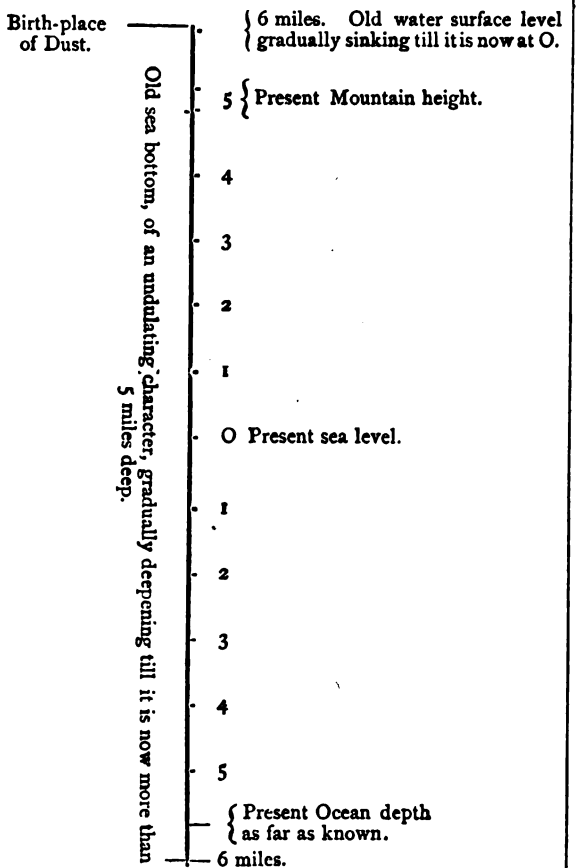
showing a descent of 1594 in a run of 30 miles." In the next cast, at about 45 miles distant, the sinker ran out "4643 fathoms, without reaching the bottom. . . . On this occasion, when some 500 fathoms of wire had run out, the sinker was suddenly swept under the ship's bottom by the strong under-current." In the Japan stream he found 3493, 3587, 3507 fathoms, and in the next cast the sinker was not detached till it had descended "to the extraordinary depth of 4340 fathoms." In one of the next six casts "4655 fathoms" were found; and, says Commander Belknap, "I have no hesitation in saying that the moment of touching the bottom was as instantly and accurately known at 4655 fathoms, or at a depth of more than

DIAGRAM showing the ABSTRACT POSITIONS of EARTH and WATER, in the PAST and PRESENT TIMES, and the POSSIBLE BIRTHPLACE of DUST.



5¼ statute miles, as at 1000 or 100 fathoms." Captain Nares remarks on the section between Bermuda and Sandy Hook:—"The soundings show that there is a remarkable hollow, 3875 fathoms in depth, immediately north of the Virgin Islands." In other places in the Atlantic Ocean he found bottom at 3000, 3025, 3150, 3827, and 2600 fathoms, between the Cape of Good Hope and Melbourne; but the currents were frequent, in one place "the stream rushing past as in a mill-race." The deep places are called troughs, gullies, and channels, according to their character, and there can be no doubt but that they have been excavated by the constant action of water currents; so that as river streams excavate channels, gullies, and troughs, the same result has followed the action of waters on the sea-bed; this bed has then, in one part or another, been continually getting deeper, while in other parts it has been continually getting shallower.

These results are followed in the two elements, water and air, by similar actions; they are both expelled from places where deposits take place, and they occupy places from which materials are removed, so that they are both constantly encroaching on or retiring from some place or another. As these actions have been going on for an unlimited period, and as the currents have maintained their cosmical characters all through their epochs, from their beginning till now, we may assume that the ocean beds affected by these currents are deeper now than when these actions first began. Man has been rash enough to suggest measures of cosmical denudation; but as the denuding forces are never equal, and never act on equal substances, we reject these measurements as unsound, contenting ourselves with remarking that the present mountain height of 5 miles must be less than it was. If, then, the height of the mountains has decreased, and the depth of the sea has increased—as the sea level, once covering the whole, has retired from the mountain tops to its present level, a distance of 5 miles, we have a reciprocity of action between these measurements, which lead us to our conclusion. There is, however, a complicated elemental action that we must notice before we can reach the point we aim at.

The currents of air and water are not continuous; there are regions where the winds blow from one direction during a part of the year, and from a contrary direction during another part. These aerial currents affect the waters, and their surface currents unite with the winds in the duties before them. In some regions the winds are too variable to affect ocean areas of any extent; though the waters may occasionally be heaped upon the shores, or be driven from them, their action is not continuous. These variable currents, as well as the persistent ones, arrange the balance of cosmical power, and though the forms of land may influence the water and the air, we must not forget that the cosmical configuration of land was due to the continuous, or to the variable conditions of air and water. We have then a great variety of surface shape to consider, all depending on the conditions under which they were formed. We have small and large mud and sand banks; we have them of every possible shape; we have long, gradually sloping shallow places and abrupt precipices below water. Those banks that have been washed up in one year may be washed away in another; while the great currents go on for ever in their season routine of duty, and slowly gather together all the materials placed at their disposal. Under the action of the constant and inconstant elements, this surface earth is now what it is. We have said that the locality of the birthplace is of little consequence to us; we claim the first cosmical dry land wherever it was, but there is a locality that offers an example of the vast labours, and the vast accumulation of atoms. This locality may have been that selected. We will dwell upon it for a brief space, perhaps it will bring us pleasantly to our goal. The region we allude to has its centre in the Himalayan mountain range, extending to Samarcand on the north-west, to the equator and Siam on the south-east. The centre of this long irregular barrier rises some 27,000 feet, about 5 miles above the present ocean level. Far away from the site of

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these mountains the southern waters now plunge against the shores of Hindostan; far away to the north and east the northern waters wash the shores of Siberia, Kamschatka, and China. The north-east monsoon still reaches Hindostan from these regions, and the south-west monsoon is still felt in the Himalayas. Long before any of these regions were dry land, the currents of wind and water had unbounded sway; they met upon the site of these high lands, and they are the certain result of a comparative quiet locality between these yearly monsoons. If the 'Tuscarora' and the 'Challenger' had sounded here at the beginning of the third day of creation they would have found shallow places, with the shallowest of all where Ghaur-Shunken, the source of light—now Mount Everest—and Dhawaligheri, or the circle of light, now raise their snowy heads.

All through the two first days of creation the seasons were as regular as they now are; the whole mass of dust beneath us testifies to the fact. The winds blew, and the ocean moved; both of them gathered spoil by the wayside, and both dropped it where it was wanted between the great cosmical currents. During all that immeasurable time, the atoms came rolling into the trysting-place before the cosmical agents; all along the undulating ocean bed they travelled on slowly but surely; smaller and smaller each atom grew, handing over every moment to the water solutions some of their lighter materials, and purer and purer grew the myriads of atoms. As they rolled on, they filled the places of those that had gone before, and as the solutions fell in with quiet corners they also subsided in their masses.

In the midst of the great area alluded to there were seasons when the winds ceased to blow, and when the waters were at rest, when light ripples took the place of waves, and light zephyrs took the place of the monsoons. The zephyr and the ripple dallied with the silver sand; their tiny efforts were still exerted in arranging and purifying. Still the glittering atoms rolled up and rolled down again; still the slumbering wavelets kissed each other, and the bright spray flakes sparkled up between them, to whisper to one another of the coming day.

Reader, have you ever stood upon a glistening sand in summer time, when the pellucid sea-wave broke in crystal purity on the gentle slope, washing up the brightest atoms to your feet? have you ever watched those atoms of hard silicious matter settling down, as if weary of their travels? and have you heard the sigh of contentment from the sands, as the hurrying waters retreated from their labours? If you have, you will comprehend the scene which took place in the Himalaya region many millions of years ago, at the commencement of man's third measure of time. There was a cosmical harmony in the scene, as wavelet after wavelet broke over the site, retiring, and still retiring season after season, from the barrier themselves were building. Higher and higher that barrier grew; weaker and weaker grew the water force as it wandered in growing uncertainty up the glittering slope; fewer and fewer flew the spray-flakes; more and more distant broke the surf-wave; deeper and deeper sunk the ocean-bed; quicker and quicker the cosmical waters retired to their channels; till at last, along the line of old contention, the summer of peace came on, the sound of the ripples died away, no more the spray-flakes dashed across the barrier. That barrier had been prepared upon the floods, and, founded on the seas, the waters were gathered into one place, and the dry land appeared. The summer breeze stooped down to kiss the first-born dust. Its God looked down from heaven, and saw that it was good.

Far be it from us—Dust—to assert in wilful dogmatism, that this Himalayan site was our ancestors' birthplace: we do not expect any one to say it was not. We record a cosmical fact that took place somewhere, at some time. It was worked out by cosmical laws, which still exist, and still prepare the mud-bank and the sand, and still erode their water beds; but the material washed up is no longer what it once was. Still, in all that the ocean leaves behind it, silicious matter will be found mixed with the refuse of to-day. All that is heaped up now is supplied by the waters: it is not all eroded from their bed, but before growths and lives were created, there was nothing to work up but the triturated fragments of the old sea-bed. In the present, in the past, all that was heaped up was equivalent to what the waters moved, and consequently what the waters heaped up of old was equivalent to that which they borrowed from their bottom, while every atom taken from thence contributed to the cosmical deepening of the sea.

We now return to our diagram, page 373. We place the original surface water-level higher than the present mountain tops, not only because these tops were once under water, but because they were once higher than they now are. As the waters rested on the highest parts of the banks which were formed under their surface, those parts were for the time part of their bed. As this bed has been deepening ever since the waters moved upon it, that bed must have occupied at various times the whole of the space from 6 miles above to its present depth. As the troughs, gullies, and channels are deeper now than other parts, so from the first there must have been an undulating bottom, deeper in some parts than in others. The diagram explains the abstract condition.

Under this view of the events that took place in man's third finite measure of infinite time, the waters remain now in the same condition as to quantity as they were then: nothing is lost. The firmament still divides the waters above from those below, their mutual connection is still maintained by a continued process of reciprocal exchange. This exchange is cosmical. The waters below supply the atmosphere, the atmosphere supplies the earth, and its surplus bounty carries away to the ocean all of earth that it finds available, the entire process evincing a supreme power of prearrangement of laws, of love and harmony, that of themselves are sufficient proof of one first great initiating cause, as well as visible proofs that this cause continues. We have ventured to explain some of the actions depending on this supremacy; man can see them in their working condition. There is no cosmical rest, no cessation of the atmospheric movements; the ocean currents never stop, and earth, our wondrous mother, is always passive.

Little more remains to be said. We contemplate the scene before us; we see the glittering dust nestling beneath the summer breeze, ready to obey the first commands. Near this brilliant group, Old Time with his venerable figure sits upon the sands, feeling the edge of his polished scythe. The vista is a long one,

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but we, the despised dusts of the present, wish to claim our heritage. That minute atom our forefather has handed down his glittering purity to us; we inherit his indestructibility and his ubiquity. M. Delesse has just shown us, what we knew before, that we are to be found in all present ocean deposits. We see our glitter in the rocks, on our footpaths, in our fields; we see it in the structure of the water growths; it forms the clothing of the grass, and shines on the highest leaf of the tallest forest tree. The microscopical growths of the waters, those fair links between the animal and vegetable worlds, use us for their habitations. We are lustrous on the feathers of the bird, on the scales of the fish, on the hair of the animal, and the animal man converts our silicious materials into crystal palaces and domestic uses, by purifying us from the impurities of the earth. We were, then, in existence before all this was done. We claim our heritage from cosmical creations, the water, the earth, the atmosphere, and from their beginning, the unapproachable, the infallible great first cause. We claim to be still guided in our way by that light; and as we wander with a faltering step into the labyrinths that we ourselves have formed, we try to read each sign-post as we go. Man in his impatience has lost the clue, and has not read those signs; but he has lit up many beacons to guide the present and the future from the rocks, and the shipwrecks of the past. We cannot descend into the *minutiæ* of life and growth; we go on with the great cosmical movements. In doing so we hope to throw a light upon present shades, and to prove the truths of our postulates. The waters gradually retired into their own depths. By this retiring of the waters the dry land appeared. On the appearance of dry land dust was produced. Or in the words of our heading—"let the waters be gathered into one place, and let the dry land appear, and it was so." If any one can prove it was not so, and can point out another reasonable cause, with cosmical laws for the birth of dust, we will gladly explore the new path. Till this is done, we shall hold by the system we have here sketched, and say The Birth of Dust is a reality.

H. P. MALET.

IMPRESSIONS OF JAMAICA.

CHAPTER VI.—A VISIT TO GOVERNOR EYRE.

EARLY one morning, by directions given over night, I was summoned out of slumber by Tom, a lad of exceeding blackness, who had engaged me in the capacity of master almost immediately on my arrival at the port of Kingston. Through the light veil of the mosquito curtains the room looked strange to my suddenly awakened sight. But having roused my senses to the recollection that some weeks had elapsed since I had retired to rest in Radley's Hotel, Southampton, and that during this interval I had travelled to a land in which glass windows, marble chimney pieces, carpeted floors, cushioned squabs and couches, down pillows, and quilted coverlets were happily unknown, I drew aside the protecting gauze, and descended from the lofty elevation of my mattress to the boards redolent of bitter orange-juice and gleaming with the labour of household hands. Not, however, without carefully investing my feet in the slippers providently placed at the bedside! For the chigoe, or "jigger," as that unpleasant insect is more commonly called, lies in wait for the unguarded step, especially of Europeans. This exceedingly minute and troublesome flea, or tick, named by naturalists *pulex penetrans* by reason of its entering the skin—generally choosing a tender hinge under the toe—is one of the natural curiosities of the Antilles; and I confess with something like humiliation and regret that my great caution was effectual in preventing me from obtaining a personal experience of the creature's habits. I remember to have heard, when I was a boy, of somebody who was as proud of something as he had been "of the first jigger he got in the West Indies." Perhaps it *is* a thing to be proud of, though not to thank heaven for. One of my English friends, a fellow-voyager by the 'Atrato,' attained the honour and glory which I missed. But on the whole I may be satisfied with having enjoyed the privilege of seeing him operated upon. The chigoe buries himself between the epidermis and cutis; and a delicate skill is required to dislodge him. It is a skill, however, which almost every negro who has reached the years of as much discretion as he is likely ever to possess, will have acquired by practice. Tom, already mentioned as having done me the honour of permitting me to pay him wages, was a sufficiently expert hand at jigger-drawing. He was the operator in that case to which I have alluded. His instrument was a fine needle, the point of which he tried many times, and with great care, on the open palm of his own hand. Then dropping on one knee, he took on the other my friend's afflicted foot, and gently tightened the skin on either side the tiny entrance-hole made by the chigoe, using for the purpose the thumb and forefinger of his left hand. Then, with many cautious touches of the needle-point, as if he were stippling a very fine miniature, he extended the orifice; the extreme delicacy of his work being testified by the fact that, tender as was the part on which he operated, my friend could not feel any pricking. A great danger has to be avoided in thus getting at and removing the small enemy. If he is not fetched out whole, ten to one the particles left behind will be a cause of grief far greater than any that the sound unbroken insect would of himself be able to inflict. Perhaps it is not *he*, but *she*, that has entered on possession, like a determined squatter. In that case, look out for eggs, and a multiplication of jigger-torment! But the negroes are so careful and dexterous that any bungling in this business is of rare occurrence. The result of such miscarriage in chigoe extraction would be a poisoned ulcer, terribly painful, and hard to cure. The chigoe, by-the-bye, is white, and, therefore, the more difficult of detection when buried in a fair skin.

Fortified by a cold bath and a hot lobster, which locustan luxury in the tropics differs nowise from the same species of crustacea caught on Scottish and Norwegian coasts, I took my seat in the slender buggy which the Creoles of Jamaica have borrowed from the United States. It was barely six o'clock when my active ponies were trotting up the sandy slope by which we left Kingston. I was going up hill to the extent of 4000 feet that morning, but not in the buggy. Wheel-traffic in that northern direction ends at The Gardens, or rather at the store and posting-house, then kept by a Mr. Lazarus, in the vicinity

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thereof. Jamaican Creoles are proud of their roads. Even those of the low grounds, which cannot but be sandy, are kept in as good condition as is possible, gangs of "hard-labour convicts" being chiefly put to this kind of work. Those very black gangs, working in fetters, under the guard of a single armed warder, himself a negro of the deepest dye, had a strangely grim appearance in my eyes, and I must confess to having read with astonishment in Mr. Sewell's generally faithful account of the British West Indies that the "hard labour" in their case is something very like a farce. In the Penitentiary it may be that the peccant negro has a rather easy time of it, but, certainly, the convict forced to work at road-making, with those irons about his tender shins, looks very far from being the blissful creature of Mr. Thomas Carlyle's painting, with his "beautiful black muzzle" buried in pumpkin. It is possible that, being on the open road, he has now and then the opportunity of exchanging a grin, or, perhaps, a familiar word with some free and light-hearted George or Jemima of his acquaintance, passing to or from market. But according to such observations as I was able to make, the hapless road-mender was much too sulky for habitual communings with the world at large; and I saw not a sign of that playfulness and that gay greeting of passers-by which would seem to have struck Mr. Sewell as he watched the conduct of these interesting felons. Perhaps a more stringent code of regulations for the discipline of the convict road-menders may have been introduced, in the period between the publication, by Messrs. Harper, in New York, of Mr. Sewell's valuable book—written, by-the-bye, from the American stand-point—and my visit, two or three years later. I never passed a gang of those ill-looking savages but they were glum and speechless. I never saw one of them bestow a glance from his hated work, but that glance was a scowl. The guard and overlooker, in his white Osnaburgh suit, with a Colt's revolver stuck in his belt, stood like a watchful sentry as he was; his black face settled to that stern expression of a sense of high official importance which the negro is apt to assume when a public trust of any kind is reposed in him. He did not seem, I thought, by any means the kind of man to allow prisoners in his charge "to stop and talk to girls, and amuse themselves in any manner they liked." Such indulgence from a negro in authority to negroes in subjection to his command, would indeed be a strange contradiction of all ordinary experience touching the African character.

The commonest and most serviceable hedges on either side, where the road lies among grazing pens, are formed of the tall cactus known in Creole parlance as the dildo. This class of succulent plants is remarkable for vitality and spontaneous growth. The usual way of making a fence that shall become in very quick time a perfectly impassable barrier against cattle, is to chop up a certain number of dildoes into lengths of about 18 inches or 2 feet, and to lay these truncated segments loosely in a row, leaning against a sloping bank of earth. Without further tending they take firm root, and quickly grow to a height of 14 or 16 feet, throwing forth strong sharp spines laterally. Penguins and other kinds of cactus abound in the hedges and by the road side; and you may see on all the broad oval-shaped blades of this fleshy order of plants, rough white spots that look like splashes of lime. These excrescences are the envelopes of the cochineal insect, which fastens and fattens on the thick flat leaves, if leaves we may call them, that are truly but the stem itself taking leaf-like shapes. I have picked off the white warty blotch and crushed it; when instantly a stain of the purest and most delicate crimson-carmine was produced. Could not this be made a source of profit, by means of a little industry? I put the question to an intelligent planter, who returned for answer the words, "Yes, surely; but that would imply rather more sense than we have in Jamaica."

The stranger travelling along these well-made highways will have almost as many chances of being attracted, interested, and perhaps puzzled, by novel objects of nature, as would peradventure befal him in the forest or on the wild mountain pass. I call to mind at this moment the huge masses, seemingly of dry mud, attached to and sometimes encircling the trunks and large branches of trees. Seeing for the first time these immense projections, varying in size from a nine-gallon cask to a hogshead, on trees very near Kingston, and close to the high road, my pardonable mistake was the conjecture that they were the work of human hands—perhaps some rude tropical method of grafting, or setting the broken limb of a tree, as in England I have known the main branch of a large mulberry-tree replaced after its detachment, and patched up with clay. Having the curiosity to examine one of these bulky protuberances, before I knew what it was, I found that the material was indeed earth, that the outside was very crumbly, but that, penetrated to the depth of half an inch or less, the substance was hard, as if a fine sort of loam had been kneaded with gelatine or glue, and left to indurate with time. Here also appearances were borne out by fact; but had I pursued my search more keenly I should have broken through the outer wall of what was in truth an ant's nest; should have laid open the interior of a mansion of many halls and corridors; and should have seen that the material of the building was harder and denser than the wood of the tree to which it was attached. There is no part of the nest, I am told, that is not honeycombed with chambers and passages, the floors, walls, and ceilings of which are as close-grained and tough as a coach-panel, and of about the same thickness, though made of a glutenized earth instead of seasoned timber. I saw no ants, nor the trace of any, when I made my superficial examination of their abode; and the nest in question may have been a deserted one. But at the same time it is worthy of note that the particular tribe of duck-ants that nidificate in this wonderful manner live an indoor life, and are so much given to working under cover that even their approach to the house or city, as we may call it, is by a shaft or vertical gallery extending along the bark of the tree, from the nest to the ground. The industrious little fellows will even build a tubular gallery, of considerable length, for some temporary purpose, knowing, as their instinct must teach them full well, that its exposed situation—across a roadway, for instance—renders it liable to speedy destruction.

There is a chameleon in Jamaica, but the ugly saurian thus designated is, oddly enough, considering his reputation, less in the habit of changing colour than any of the large and beautiful lizards. One of

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these astonished me greatly: and had it not been that I was afterwards in company of an old resident who bade me watch one of the same class of reptiles, and who observed with me its remarkable faculty of suiting its hue to the ground on which it stood, I should, at this distance of time, hesitate to record a fact which, to many persons, will seem like the outcome of an unduly excited imagination. The phenomenon has, however, been certified by the testimony of approved naturalists, as well as of casual and unscientific observers, and I have no just cause to withhold my fragment of evidence, which is this:—As I drove that morning on the road from Kingston to the Gardens, a large lizard crossed the road in front of my horses—so near that I stopped them and turned in my seat to look back at the creature, not being sure of his having escaped the wheel. He was quite safe, however, and he lay basking on the grass by the roadside, lazily and fearlessly looking at me, while I continued, with the rudeness of an English traveller, to stare at him, a native. It struck me, even then, that he was not the same in colour that he had been when I first caught sight of him as he crossed my path. He was now as green as a lizard is generally supposed to be at all times—perhaps a trifle greener—and in fact pretty nearly the colour of the grass. Suddenly, he glided to the top of a large stone, whence he resumed his attentive study of my features, even as I —to the great trial of Tom's patience, no doubt, as that intelligent and affable young man and brother sat by my side in the Blundle Hall posting carriage —still kept the ponies standing, that I might look a little longer at the lizard. He had not been more than a minute in his new position before he was of the same grey hue as the stone itself, and might have seemed a sculptured part of it. I felt the half impulse to take into my wondering confidence the black boy at my elbow, and to question him touching the natural history of the Protean reptile. But I restrained this desire for instant acquirement of knowledge, partly by reasoning with myself that Tom, from all I knew of him, was as unpromising an authority on subjects outside his domestic curriculum of clothes-brushing, boot-cleaning, horse-grooming, and jigger-drawing, as any hanger-on of Blundle Hall, and partly, also, by yielding to the same *mauvaise-honte* which kept me for a long time from inquiring into the economic philosophy of the ants' nests. The lizard was in no hurry to move from the sunny stone; but when at last he did so, it was with a view to recrossing the road obliquely towards the spot whence he had emerged when first I saw him; and most certainly before he had reached that spot his colour had changed to a dull earthy brown or drab, the same as that of the road, or of the ground-doves that pass half their lives in running for miles at a time in front of the horses in Jamaica. Here I have introduced another topic of the highway. The ground-dove is a bird that has distant relations in sub-tropical as well as tropical countries, and I saw an Australian specimen, dead, the other day, having just killed himself by flying against a pane of glass in the house of Mr. Bartlett, of the Zoological Gardens. But the Jamaican ground-dove is a pigeon with attributes which, if not entirely his own, are yet his in an eminent degree. He is very small, and he is as good at running as a red-legged partridge, without any participation in the shyness of that gallinaceous biped. In fact, there is no more sociable bird than the ground-dove of Jamaica, his persistent companionship being almost that of an inveterate bore. I have had a party of his kith and kin running before me for such an unconscionable distance that I have really felt inclined to apologise for taking them so far out of their way without being able to offer them some refreshment.

As you get out of and above the plains, and can gaze down upon Kingston's port and harbour—which you will be able to do with a sidelong glance, instead of by looking back, for the road has taken a turn almost at a right angle with the direct ascent out of the town—you begin to have a foretaste of the delight to be experienced in a mountain journey. Precipices begin to show themselves, below and above you. There is a glorious rock to which you look up with an admiration divided between it and the beauty of its verdure. Almost on the summit grows, in rank luxuriance, the prolific grass of which all kinds of cattle in Jamaica are fond; and, tempted out beyond a firm footing, by the abundance of this fine pasture, horses and other animals have fallen, and have been, literally speaking, dashed to pieces. Soon, now, we come upon the life of a village, having already passed something of the kind when we had travelled for a time along the ledge that runs parallel with the sea-shore a few hundreds of feet below, and distant perhaps 5 or 6 miles by flight of bird. Now comes in sight the wood-built grocery store of Mr. Lazarus. There are groups of negroes standing pretty idly about the spot, which has steep, palm-clad heights above it, to the left hand of the road where it stands, and an equally precipitous descent nearly opposite. Here, as I have said, wheeled carriages stop, and the traveller betakes himself to the saddle. An alarmingly small donkey was now led forth saddled, and was placed at my service; and Tom, the ponies, and the buggy were abandoned for a day or two, as I was about to become the guest, for so long, of Mr. Eyre, at Flamsted, high in the Port Royal Mountains. One agreeable circumstance which abates the grim terrors of the perpendicular rocks, along which so many of the bridle-paths and even carriage ways of Jamaica take their winding course, is the luxuriant vegetation covering those precipices. Beyond the useful knowledge that there is a fall on this side or that, you may travel with comfortable forgetfulness of danger; there being many objects of beauty, such as palms, plantains, tree-ferns, and aloes, interposing between your sight and the bare, terrible threat of destruction. Nor is the mitigation of dread a matter of appearance only. Many accidents, that must otherwise have been, for a certainty, mortal, have ended either harmlessly or with injurious consequences far less than loss of life; the saving cause being a group of plantain leaves or a mass of ferns. Riders have been fortunate enough, catching by some bough or stem, to disengage themselves from the saddle, while the horse has rolled on, or dropped from point to point, till every bone in his body was broken.

Nothing is stranger to think of, in connection with Jamaica, than the unfounded fears that have encircled its very name. First there is the climate, once supposed to be deadly to Europeans. "The Englishman's Grave" is a name that has been fastened sometimes on the island generally, sometimes on the parish of Vere. The air of Jamaica is now

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generally admitted to be salubrious, even on low grounds, when they are drained; while the mountains breathe the very atmosphere of health. Newcastle, 4,000 feet above the sea, is positively the healthiest station for British troops. That is a fact established long ago by irrefragable statistics. Of other visionary terrors, such as of poisonous reptiles and poisonous plants, I shall have something to say anon; but just at present our topic is the climate; and Flamsted, standing on or about the same level as Newcastle, is not less delightfully healthful. My only luggage, on that journey, was comprised in a dressing-bag of unusual size, bulgily packed with clothes, and rendered ridiculously heavy, I am ashamed to confess, by a perfect battery of superfluous silver-topped bottles. When I was told that a girl of ten or thereabouts was to carry this piece of luggage up to Flamsted, I expostulated strongly, representing that its weight was even more than proportioned to its size; but the bare-footed little negress met my objection, practically and decisively, by lifting the great black leathern bag, which, with its contents could not have been much if any less than three-quarters of a hundred-weight, to the crown of her head, where she balanced it with a careless ease wonderful to behold. I thought when I was in Sweden that the Dalecarlian girls and women, especially those engaged in rowing the numberless boats between the islands on which the city of Stockholm is built, were the strongest of their sex; but they are, muscularly speaking, nowhere, compared with the Hottentot and other African races. The habit of balancing every kind and manner of thing on the head, whether it be a chest of drawers or a gallipot, a bale of merchandise or a box of Morrison's pills, is also a notable peculiarity in the negress. When she makes a purchase, however small, she always walks out of the store in triumph, with the article on her head. A small phial of tincture for the tooth-ache —malady most dreaded of the negro race—I have often seen balanced upright on the cranium of the much-suffering patient. Finer exercise for giving habitual grace and freedom to the carriage of the body could not be devised by a fashionable teacher of calisthenics, than this custom of poising objects, the lighter the better, on the head. Lessons in deportment all come short in effect of this first if not only lesson in the negro school of elegance. If, then, ye mammas and governesses, there happen to be a fast-growing, angular, awkward, stooping girl among your brood, who resists all improving precepts to hold her head up, throw her chest out, keep her shoulders down, &c., give her a pasteboard vase, or something that is light, slender, and not susceptible of damage from a fall, and oblige her to balance it continually upright on her head, whether she walk, run, sit, or stand.

Guide and porter too was my small negress, in that toilsome ascent; and I trembled at times for the dressing-bag of Shäfer's ingenious handiwork, which was at once the admiration and the envy of all my European friends and acquaintance, and which now seemed in direst peril of precipitation among the mountain shrubbery and the masked rocks. For the little bearer balancing the bag that rivalled her own face in jetty blackness walked always by preference on the edge of the beetling promontory; and though we presume that Blondin is sure-footed enough for his own safety, still we must all think dubiously of the insurance-policy held by the man whom Blondin undertakes to carry across Niagara. So did I surmise that the little negress knew perfectly well how to take care of herself; but it was by no means so comfortably evident to my mind that her own preservation was identical with the security of my luggage.

Wild, grand, beautiful as was the scenery disclosed by that ascent to Mr. Eyre's mountain-retreat, I was yet to behold panoramic pictures that were grander, wilder, and more lovely. A "painted garden" Columbus called Jamaica; and this image, so suggestive of refined gold doubly gilt, is one which must be ever present to the traveller on that enchanted isle. Moreover, it happens to nine persons out of ten who go to Jamaica, from this side the Atlantic, that an increasing scale of wonders and delight is in store for them. That is to say, they will inevitably land at Kingston, after having coasted that side of the island which is most remarkable for boldness, but which lacks by comparison the exquisite beauty of the northern shore. Then they will gradually make acquaintance with the scenery of the interior, first, of course, with that which is adjacent to Kingston. After having seen something of the Port Royal Mountains, they will most probably proceed to St. Jago de la Vega, now more commonly styled Spanish Town, and will find another and more sweetly picturesque kind of country in the corruptly named "Bog Walk"; ultimately, they may cross the chain of Blue Mountains to the north of the island, and find, amid its pimento-groves and cascades, a marvellous beauty of which their former experience, charming though it was, had given them no conception. This is the progressive order of my Jamaican reminiscences; and I do not doubt that it corresponds exactly with the chain of recollections formed by most other visitors from Europe, to that ignorantly wasted treasure of our West Indian possessions. And it is thus that, in recalling my first mountain journey in Jamaica, I find less to speak of with enthusiasm, because of the subsequent impressions, which were so deep as partly to obliterate those which went before.

On reaching the abode of his Excellency, whose acquaintance I was then about to make, a month or two before his retirement from the island he had governed with so bitterly thankless an effect, I found a home more English than anything I had seen since leaving England in mid-winter; and in this smiling temperate atmosphere, the difference of climate struck me with even greater force than in the hot sandy lowlands, where all surrounding objects were strange. The lady of the household pointed out to me, with cheerful pride, that there were actually English fireplaces in the principal rooms; and though, at the end of January or beginning of February, when the Jamaican year was at its coldest, there were no fires in the comfortable open grates—the temperature being then something like English summer-heat—I was given to understand that there *might* be one or two evenings out of the 365 when a blazing log would be agreeable. Still, the house was on the ordinary plan of domestic architecture in the British West Indies; that is to say, the rooms were on one floor, and branched off from a large central chamber or hall. It was rather in the fittings and appointments than in itself that the dwelling was English. All the furniture, of course, had been carried up bodily from the plains; and, thinking

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of the ledges up which I had clambered on donkey-back, I heard, with a feeling of considerable respect for the strength of the negro, that Mrs. Eyre's piano had travelled to its elevation of 4000 feet, on the heads of four men, from the establishment of Messrs. Turnbull and Lee, in Harbour Street, Kingston. Mr. Eyre and his secretary were in the midst of very important business at this time, and were up to their eyes in papers, which were being perused, docketed, and arranged, for production or reference in the Court of the Royal Commission, at Spanish Town. It was an anxious as well as a laborious time for my host; but he received me in the kindest manner; and, throughout my short stay, paid me the most courteous attention. Before dinner on that day of my arrival at Flamsted, Mr. Eyre took me for a rambling walk, in which his love of nature and acquirements as a naturalist were made pleasantly apparent; nor, in that mere appetizing lounge, could I forbear to think of his famous walk, as an exploring geographer, across the Australian Continent. Of his agility, too, I had proof in an act of hospitable kindness; for when I expressed admiration of a large white orchid-bloom which overhung our path, he climbed the rock with the lithe and graceful ease of a mountaineer, and brought me down the flower.

Returning to the Flamsted domain, we dined *en famille*, and in true English fashion. The roasts were saddle of mutton and turkey, a dual fact which is not now recorded without some reason. The oxen in Jamaica, and no less the sheep, are an honour to the breeders and graziers on that island. A stranger will admire most the larger cattle, which are always in magnificent condition; but, perhaps because mutton is just twice the price of beef—or was at the time I speak of—the Creole stock-farmer thinks most highly of the native reputation for sheep-breeding. Fresh meat has to be carried every day from the Kingston market to residences situated, like Flamsted, among the lofty hills; but poultry can best be reared in such spots, and I found that turkeys were an especial boast of the little mountain home of Governor Eyre. Wild turkeys, if not abundant in Jamaica, are yet common enough to denote the suitability of the climate for tame turkey breeding. The garden at Flamsted was the most thoroughly English part of the little estate. Here strawberries were growing, when the young members of the family piloted me about the grounds on the morning after my arrival. All the fruits were English, unless pines are to be excluded, which would be hardly fair, considering that the best are grown, though at a terrible cost, in England. Had the times been favourable for the longer sojourn of a visitor at Flamsted, I should have learned much concerning the natural history and botanical capabilities of Jamaica, from Mr. Edward John Eyre, the explorer of Western Australia, and discoverer of Lake Hindmarsh, who, whatever may be the differences of opinion as to his conduct in the suppression of a black rising on the island of which he was governor for the British crown, must be regarded with admiration as the hero of the greatest land-cruise ever undertaken in the cause of geographical knowledge.

GODFREY TURNER.

(To be continued.)

Reviews.

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ISMAILIA.*

SIR SAMUEL BAKER, the discoverer of one of the great African equatorial lakes, has had the rare good fortune, which is mainly due, however, to his own high qualities, of returning to the scenes of his former exploits, in order to redress the wrongs he had witnessed, and to complete his work. His late expedition was, as he says, the practical result of his original explorations, in which he had been an eye-witness to the horrors of the slave trade. The state of things was so shocking as to excite strong feelings of indignation in any traveller. Many would have been content to denounce it. Baker resolved, if possible, to put an end to it. The Arabs, who had deserted their agricultural occupations in the Soudan, formed companies of brigands in the pay of various merchants of Khartoum. The largest trader had 2500 Arabs in his pay, employed as brigands in Central Africa, regularly organised, divided into companies, and armed with muskets. They occupied enormous tracts of country by means of chains of stations, and wherever they came, anarchy, desolation, and murder came also. Not less than 50,000 slaves were thus annually captured, and either held in camps, or sent down the White Nile, and by the route of Darfur and Kordofan. The loss of life was frightful, anarchy spread over the invaded country, followed by devastation and ruin.

Sir Samuel Baker's expedition was organised to subdue to the authority of the Khedive of Egypt the country south of Gondokoro, to suppress the slave trade, to introduce a system of regular commerce, to open navigation on the great lakes of the equator, and to establish a chain of military stations and commercial depôts, Gondokoro being the base of operations. Sir Samuel changed the name of this place from Gondokoro to Ismaïlia, in honour of the Khedive, and, as that of the principal base of his operations, he has taken the new name as the title of his work.

The intrepid English explorer, to the ill-concealed disgust of the people of Egypt, received the supreme command of an expedition to be fitted out for the above objects for four years, with the rank of Pasha, on the 1st of April 1869 He was accompanied by Lady Baker, by his nephew Lieutenant Baker, R.N., as head of the topographical department, and by a staff of English engineers and shipwrights, besides a force of 1645 Egyptian troops; and in February 1870 the expedition left Khartoum. Baker's military operations, and the political arrangements which followed, are described in these volumes in the talented writer's best style, and with a clearness and vigour which will enchain the imaginations of thousands of his countrymen. The achievement is one of which Englishmen may well be proud; and it is fortunate that among the gifts of the accomplished commander

* *Ismaïlia:* a Narrative of the Expedition to Central Africa for the Suppression of the Slave Trade, organised by Ismail, Khedive of Egypt. By Sir Samuel W. Baker Pasha, M.A., F.R.S., F.R.G.S., &c., &c. With Maps and Illustrations. 2 vols. Macmillan, 1874.

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of the expedition is that of describing with his pen the services performed in the field.

The interest of the reader will be sustained throughout, as he is told of the difficulties in the Bahr Giraffe, of the march to Fatiko, and onwards to Unyoro, of the night attack and conflagration at Masindi, of the hazardous and toilsome retreat, of the bayonet charge of the "Forty Thieves" across the plain at Fatiko, of the disruption of the slave traders, and of the final pacification and annexation of a vast region, extending to the borders of Uganda. Sir Samuel Baker, in this brilliant campaign, passed over his old ground, but, as an observant geographer, many of his remarks convey fresh information; he collected numerous reports from traders who came from unexplored regions, and his nephew, Lieutenant Baker, made valuable astronomical and hypsometrical observations.

Ascending the Nile from Khartoum the expedition reached the junction of the Sobat on the 16th of February 1870, a distance of 684 miles above Khartoum by the river. The Sobat is one of the most important of the Nile tributaries, on the right bank, and is almost entirely unknown. Its basin presents an enticing field for future discovery, and, meanwhile, the information respecting the Sobat, collected by Sir Samuel Baker, is very acceptable. He found the river about 8 feet below the level of the bank in February, the water being yellowish and colouring the White Nile for a great distance. When he saw the mouth of the same river, in January 1863, it was bank-full. He thus continues his account of it:—

"The volume of water brought to the Nile by this river is immense, and the power of the stream is so superior to that of the White Nile that, as it arrives at right angles, the waters of the Nile are banked up. The yellow water of the Sobat forms a distinct line as it cuts through the clear water of the main river, and the floating rafts of vegetation brought down by the White Nile, instead of continuing their voyage, are headed back, and remain helplessly in the backwater. The sources of the Sobat are still a mystery; but there can be no doubt that the principal volume must be water of mountain origin, as it is coloured by earthy matter, and is quite unlike the marsh water of the White Nile. The expeditions of the slave-hunters have ascended the river as far as it is navigable. At that point seven different streams converge into one channel, which forms the great river Sobat. It is my opinion that some of these streams are torrents from the Galla country, while others are the continuation of those southern rivers which have lately been crossed by the slave-hunters between the second and third degrees of N. latitude. The White Nile is a grand river between the Sobat junction and Khartoum, and after passing to the south of the great affluent, the difference in the character is quickly perceived. We now enter upon the region of immense flats and boundless marshes, through which the river winds in a labyrinth-like course for about 750 miles from Gondokoro."

The junction of the Bahr Giraffe is 38 miles above the Sobat; and here the expedition came to its great difficulty. The White Nile was so obstructed by floating vegetation that a solid mass, called the *sudd*, had been formed. Dr. Schweinfurth tells us that the *sudd* is almost entirely composed of the *Papyrus* reed. The entire river became a marsh, beneath which the water oozed through innumerable small channels. As the percolation went on, the tangled mass acted as a filter, and the mud was deposited, forming banks and shoals. This had gone on for five or six years, and all navigation on the main river had ceased. The slave-traders then began to use the Bahr Giraffe, a channel passing from the White Nile above the *sudd* by a more direct course to a point below it. But there was much obstruction in the Bahr Giraffe also, canals had to be cut through dense masses of compressed vegetation, and the passage involved a long and toilsome operation, which tried the patience and endurance of officers and men to the utmost.

During August 1870 Sir Samuel Baker explored the *sudd* on the main river, which commenced about 12 miles above the Bahr Giraffe. The water below this extraordinary obstruction was quite clear from floating vegetation, as it had been filtered through the compressed masses. Ismail Yakub Pasha, the Governor of Khartoum, appointed in 1873, commenced the great work of removing the *sudd*. The Khedive had given orders for the execution of this important operation, in consequence of letters written by Sir Samuel Baker in 1870. There was no engineering difficulty in the undertaking, which was simply a matter of time and steady labour. Ismail Yakub set to work with a large force, and when Baker passed on his way home, about half the obstruction, which extended for many miles, had been cleared away. The force of the main stream, thus confined by matted and tangled vegetation, materially assists the work. The prodigious rafts of weed, as they become loosened, are hurried down the stream, and on one occasion these masses swept away and buried six native vessels. The *sudd* illustrates one important agency by which the courses of rivers are diverted, and shoals and islands are formed.

Sir Samuel Baker has, on three occasions, visited the mouth and lower course of the Bahr Gazal, the only Nile tributary on the left bank, and his remarks on this river are valuable. On all three occasions he remarked the total absence of current. In 1870 this was the more remarkable as it was in August and the river was full. He sounded the depth of the channel, which gave a remarkable mean of 7 feet throughout, showing that the bottom was perfectly flat, and had not been subjected to the action of any stream which would have caused inequalities in the surface of the ground. Baker thinks that there must be some outlet, concealed by the marsh-grass, which carries away the water brought down by the Djour, and the other streams explored by Schweinfurth, into the lacustrine regions of the Bahr Gazal; and there is no doubt that the evaporation, and also the absorption of water by the immense area of spongy vegetation, is a great drain upon the volume subscribed by the affluents from the south-west. The experience acquired by Baker during his visits to the Bahr Gazal, have convinced him that little or no water is given by it to the White Nile. The great affluents of the Nile invariably flow from the south-east, the Atbara, Blue Nile, Sobat, Asua, and Victoria Nile; a fact upon which Baker has dwelt in his former works. This proves that the direct drainage of the Nile Basin is from south-east to north-west; and hence Sir Samuel suggests that, as the inclination of the country is towards the west, there may be some escape from the lake marshes of the Bahr Gazal in the same direction.

The next point of geographical interest reached by the expedition was the river Asua, near its junction with the Nile, in latitude 3° 43′ N. The bed of the Asua was about 120 yards in width, and the maximum rise of the river about 12 feet. During the wet season

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the Asua is a frightful torrent. In 1864 Baker had crossed the Asua about 30 miles higher up. About 8 miles to the south, and at an elevation of 1000 feet above the river, there was a splendid view over a wide extent of country. To the west, beyond the White Nile, was the precipitous mountain of Gebel Kuku, descending in a series of rugged terraces, from a height of 3 or 4000 feet to the river, at a point where it boils through a narrow gorge between the mountains. The entire volume of the Nile, above this pass, flows direct from the Albert N'yanza, which is about 30 miles to the south-west. Here, at Afuddo, Baker had hoped to bring his steamers; and he considers that this place is destined to become the capital of Central Africa. There is a beautiful plain, south of the Asua, where the little river Unyama falls into the White Nile, to which Baker gave the name of Ibrahiméyah, after the Khedive's father. The depôt for steamers will be near the mouth of the Unyama, and the trade of Central Africa, developed by the navigation of the Albert N'yanza, will concentrate at this spot, whence it will be conveyed by camels for 120 miles to Gondokoro, until a railway is constructed.

Advancing to the south, by Fatiko, the expedition crossed the Victoria Nile, and reached Masindi, the capital of Unyoro. Sir Samuel Baker gives a vivid description of the scenery, of the resources of the country, and of its inhabitants; and he collected much valuable geographical information from merchants, and from the envoys sent to him by M'tésé, the king of Uganda.

Two native merchants from Karagwé arrived at Masindi to purchase ivory from Unyoro, with whom Baker had several conversations. They enumerated the districts on the east shore of the M'wootan N'zigé, or Albert N'yanza, in their order from Unyoro to Machoonda, beyond which they knew nothing, except that the lake extends for an enormous and unknown distance. On the west shore is the cannibal country of Buamba. One of the districts named by the merchants was Barundi, which Baker identifies with Speke's Urundi, in about 3° S. latitude. This brings the Albert N'yanza *beyond* the north end of lake Tanganyika, and points to the conclusion that Tanganyika and M'wootan N'zigé are only one vast lake bearing different names according to the localities through which it passes. On another occasion Baker was told by native merchants that they had actually travelled from Chibero, on the Albert N'yanza, to Ujiji by canoe. Cameron's height of Tanganyika above the sea, which is the best that has been taken, is 2573 feet; and that of the Albert N'yanza, taken by Baker at Vacovia, in 1864, is 2720. The difference is so slight as to be fairly attributable to instrumental error.

The great geographical achievement of Baker's expedition is the establishment of his former positions by careful observations, and the accurate mapping of a tract of country which will form a point of departure for future exploration. This work is due to Lieutenant Baker, R.N., who established the latitude of twenty-four places by forty observations, fifteen longitudes by lunar distances, two by occultations of Jupiter's satellites, and the height of thirty-three places above the level of the sea. Lady Baker registered a complete series of meteorological observations. But this was a very insignificant portion of the able assistance given to the expedition by this devoted wife. She cared for the sick when there was no medical man with the party, and her gentle aid brought comfort to many whose strength might otherwise have failed.

We have briefly touched upon the points in Sir Samuel Baker's work which appear to be of most geographical interest; but no review can give any adequate notion of the contents of these charming volumes, which should be, and no doubt will be, carefully read by all English geographers, in common with thousands of their countrymen.

Colonel Gordon, R.E. has been appointed by the Khedive to continue the work which Sir Samuel Baker has so well begun, and thus the pioneer explorer will have the unusual satisfaction of knowing that his labours will not have been in vain, but that they will be made continuous by his able and energetic successor.

ESSAYS ON THE LANGUAGES, LITERATURE, AND RELIGION OF NEPAL AND TIBET; together with further Papers on the Geography, Ethnology, and Commerce of those Countries. By *B. H. Hodgson.* (Trübner, 1874).

THESE essays were originally printed partly in *Illustrations of the Literature and Religion of the Buddhists* (Serampore, 1841), and partly in *Selections from the Records of the Government of Bengal* (No. xxvii., Calcutta, 1857), and were reprinted in the *Phœnix*, Professor Summers's Magazine for China and Eastern Asia. They are now again reprinted in a collected form, with corrections and additions.

Mr. Hodgson, during his long residence at Katmandu, had unequalled opportunities of collecting information respecting the languages and religion of Nepal and Tibet, a field of research in which he still stands almost alone. His valuable papers were scattered in journals and magazines which were becoming every year more inaccessible, and this volume will be welcomed as a most valuable publication. There still remain, however, many extremely important papers by Mr. Hodgson, which have not been collected, and it is, therefore, very much to be desired that the reception of the present instalment should be such as to lead to the re-publication of the remaining essays.

The present volume is divided into two parts, the first containing eleven essays on the languages and literature of Nepal and Tibet, and on Buddhism; the second comprising eight essays on the physical geography of the Himalayas, on the aborigines of the Himalayas, on the origin of the military tribes of Nepal, on the tribes of Northern Tibet, and on the commerce of Nepal.

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NOTES ON THE LAND TENURES AND REVENUE ASSESSMENTS OF UPPER INDIA. By *Patrick Carnegy, Commissioner in Oudh.* (Trübner, 1874.)

MR. CARNEGY was engaged for ten years in carrying into effect the *talukdari* system in Oudh, which was decided upon by Lord Canning in 1858. The present publication consists of papers drawn up during the progress of the settlement by Mr. Carnegy, which he has since carefully edited in the hope that they may prove useful to students of Indian administration. The first two chapters describe the method of deciding claims to land, and the nature of the various proprietary and sub-proprietary tenures in Oudh; and in the third there is an account of the thorough investigation that was made into the tenant's right of occupancy. Then follows a very interesting chapter on the more influential class of

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landlords, or *talukdars*, with an account of their origin and history; and the volume concludes with a description of the system of land assessment in Oudh. These five treatises are clear and comprehensive, and will give an enquirer an excellent general idea of the character of the land tenures in Upper India, and of the nature of the complicated and difficult duties entailed upon a settlement officer.

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ARCTIC EXPERIENCES, CONTAINING CAPTAIN TYSON'S WONDERFUL DRIFT ON THE ICE FLOE, &c. Edited by *E. Vale Blake*. (Sampson Low & Co., 1874.)

WE trust that this volume is not to be the only history of the voyage of the 'Polaris.' The first hundred pages consist of paragraphs on Arctic discovery with sensational headings, in the style and on the plan of the *New York Herald*. We are then treated to 300 pages of Captain Tyson's journal and remarks. Now Captain Tyson was not the commander of the expedition, nor the second in command who succeeded on the death of Captain Hall, nor had he charge of any of the scientific observations; and it does not appear that the book is published with the sanction or concurrence of his comrades. The tone of this officer's remarks leaves a very bad impression. He constantly sneers at the conduct of his fellow voyagers while in the ship, and his journal, kept during the drift on the floe, contains accusations against his comrades which nothing but positive evidence, of which there is none, can justify. It is a pity, we think, that such a production should be decked out with numerous illustrations from wood blocks which were prepared for other works, and with which Captain Tyson's proceedings have no connection whatever. This kind of "book-making" is always objectionable, but it is particularly so when it is adopted in order to dress up a worthless publication in false plumage.

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TABLES OF TEMPERATURES OF THE SEA AT VARIOUS DEPTHS BELOW THE SURFACE, taken between 1749 and 1868. Collated and reduced, with notes and sections, by *Joseph Prestwich, F.R.S., F.G.S.* (from the *Proceedings of the Royal Society*, No. 154, 1874).

MR. PRESTWICH has collected these series of observations with a view to the geological bearing of the subject, and they will form a valuable supplement to those collected since 1868. The older observations have been supposed not to be reliable on account of the error caused by pressure on the thermometers at great depths; but it appears that this error was taken into account so early as 1836. Mr. Prestwich's paper contains a record of 1300 observations, arranged according to the degrees of latitude, and all reduced to common scales of thermometer, measure of depth, and meridian. The observations extend over much ground that has not been covered by the expeditions of the 'Lightning,' 'Porcupine,' and 'Challenger'; and enable the author to arrive at some general conclusions, which in the main agree with those of Dr. Carpenter, especially as to the flow over the ocean bottom of cold under-currents from the Poles to the Equator.

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TOPOGRAPHICAL AND HISTORICAL SKETCH OF THE STATE OF OHIO, with an Historical Map. By *Colonel Charles Whittlesey*. (O. W. Gray, Philadelphia, 1872; London, Trübner & Co.)

THE map accompanying this interesting pamphlet shows the sites of ancient earthworks in the State of Ohio, and the different parts of the country occupied by the Indian tribes between 1758 and 1780, with their principal trails and war-paths. The pamphlet contains an account of the Indian tribes of the Ohio, with an abstract of so-called treaties with them, conveying land, and of the successive conflicts and wars with European settlers. During the revolutionary war the western Indians remained loyal, and a horrible massacre was committed upon their women and children by the militia of Western Pennsylvania; but their country was abandoned to the revolted colonists at the peace, who have nearly improved the poor Iroquois, Delawares, Shawnees, Miamis, and Wyandots off the face of the earth. Colonel Whittlesey, who is President of the Western Reserve and Northern Ohio Historical Society, also gives some carefully prepared statistical and topographical information relating to his State.

Bibliography.

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WORLD.

GIGLILI (E. H.) Zoologia della Magenta. I cetacei osservati durante il viaggio intorno al globo della R. Pirocorvetta Magenta. 4to., pp. 106. Map. Naples, 1874.

HÜBNER (Baron). A Ramble round the World. Translated by Lady Herbert. 2 vols. 8vo., pp. 960. London, 1874. 5s.

FRANCE.

JOANNE (A.) The Diamond Guide for the stranger in Paris. 126 illustrations and map. 32mo., pp. 420. Paris, 1874. 2s. 6d.

KLEINE (E.) La France agricole, industrielle et commerciale. Cours de géographie. 2e. ed. 12mo., p. 463. 6 maps. Paris, 1874. 2s. 6d.

JOURDAN (J.) Atlas-guide historique et descriptif des Pyrénées de l'une à l'autre mer. 18mo., pp. 278. 12 maps. Paris, 1874. 4s.

STATISTIQUE de la France. Résultats généraux du dénombrement de 1872. 8vo., pp. 148. Nancy, 1874.

GERMANY.

WÜRTTEMBERGISCHE Jahrbücher für Statistik u. Landeskunde. Hgs. von dem statist. topogr. Bureau. Jahrg. 1872. 4to., pp. 446. 2 plates. Stuttgart, 1874. 5s.

KOLLMANN (Dr. P.) die Vertheilung des Bodens, u. Viehstandes in Oldenburg graphisch dargestellt. Bearb. im Auftrage des Oldenb. Staatsministeriums. Fol., pp. 16 and 12 plates. Oldenburg, 1874. 2s. 6d.

GOTTSCHALCK (F.) A Guide through Saxon Switzerland. 16mo., pp. 94. Maps. Dresden, 1874. 1s.

SCHRICKER (Dr. A.) In die Vogesen. Ein Führer. 8vo., pp. 208. Maps. Strassburg, 1874. 3s. 6d.

WERNER (Dr.) Bad Kissingen u. seine Umgebung. Rathgeber fu. wegweiser f. Kurgäste. 8vo., pp. 160. Map. Würzburg, 1874. 1s. 6d.

HANNOVER und UMGEGEND. Entwicklung u. Zustände seiner Industrie u Gewerbe. Vom Han. Bezirksverein deutscher Ingenieure. Maps. 16mo., pp. 294. Hanover, 1874. 4s. 6d.

RENZ (Dr. W. Th.) das Wildbad im Königreich Württemberg wie es ist u. wie es war. Map and plans. 8vo., pp. 572. Wildbad, 1874. 6s.

SANDLER (Chr.) Handbuck der Leistungsfähigkeit der Industrie Deutschlands, Oesterreichs, Elsass-Lothringens u. der Schweiz. Mit Fabrikantenregister.

Vol. I. Preussicher Staat. 4to., pp. 1906. Leipzig, 1873. 20s.

Vol. II. Kleinstaaten Nord Deutschland, Süd-Deutschland, Elsass-Lothringen u. Schweiz. 4to., pp. 762. Leipzig, 1874. 20s.

SWITZERLAND.

RULLMAN (W.) Am Genfersee. Bilder u. Skizzen aus Montreux u. Umgebung. 8vo., pp. 158. Zofingen, 1874. 2s.

ROTH (A.) Thoune et ses environs. 8vo., pp. 178. 2 maps. 39 woodcuts. Bern, 1874. 1s. 8d.

BELGIUM.

CONTY (H. A. de). La Belgique en poche, guide. Ed. Belge. 18mo., pp. 252. Paris, 1874.

ITALY.

MUZZI (Prof. S.) Vocabolario geografico-storico-statistico dell' Italia neo suoi limiti naturali. Bologna. In parts at 1s. 8d.

PONTANI (F.) Italia. Trattatello di geografia nazionale. 16mo., pp. 192. Milan, 1874. 1s. 8d.

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STATISTICA del regno Italiana. Amministr. pubblica—Bilanci comunali. 4to., pp. 208. Rome, 1874.

KADEN (W.) Wandertage in Italien. 8vo., pp. 482. Stuttgart, 1874. 6s.

DA SCORNO (F.). Nuovu guida di Pisa storico-statistica, commerciale. 24mo., pp. 226. Pisa, 1874.

GARONI (N. C.) Guida storica, economica ed artistica della citta di Savona. 8vo., pp. 292. Savona, 1874. 2s. 6d.

BIZZOZERO (G. C.) Varese e il suo territorio. Guida descrittiva. 16mo., pp. 244. Varese, 1874. 2s.

CELESIA (E.) Savignone e Val di Scrivia. Passeggiate Apennine. 16mo., pp. 140. Genoa, 1874. 1s. 8d.

COOK'S Handbook to Venice. 12mo., pp. 78. London, 1874. 1s.

PORTUGAL.

DE MACEDO (J. A.) A Guide to Lisbon, and its environs, including Cintra and Mafra. 8vo., pp. 334. Map. London, 1874. 7s. 6d.

JACKSON (Lady C. C.) Fair Lusitania. Illustrated. 8vo., pp. 400. London, 1874. 21s.

RUSSIA.

STATISTISCHE und andere wissenschaftliche Mittheilungen aus Russland. 7 Jahrgang. 8vo., pp. 174. St. Petersburg, 1874. 3s.

MATTHAI (F.) Der auswärtige Handel Russlands. 8vo., pp. 254. St. Petersburg, 1874. 9s.

MARTIN (J. A.) La Russie actuelle. Map. 32mo., pp. 175. London, 1874. 3d.

ICELAND.

MAURER (K.) Island von seiner ersten Entdeckung bis zum Untergange des Freistaats. 8vo., pp. 490. Munich, 1874. 10s.

JARDIN (E.) Voyage géologique autour de l'Islande, fait en 1866 sur la frégate la Pandore. 8vo., pp. 40. 2 plates. Paris, 1874.

ASIA.

VIAL (Capt. P.) les premières années de la Cochinchine, colonie française. Vol. I., 8vo., pp. 410. Map. Paris, 1874.

CHINA. Handels-Statistik der Vertrags-Häfen für 1863-72 Zusammengestellt für die öesterreichisch-ungarische Weltausstellung. 4to., pp. 336. Vienna, 1874. 20s.

DALLET (Rev. Ch.) Histoire de l'eglise de Corée, précédée d'une introduction sur l'histoire, les institutions, la langue, les moeurs et coutumes coréennes. Map and plates. 2 vols., 8vo., pp. 1184. Paris, 1874.

BAVIER (E. V.) Japan's Seidenzucht, Seidenhandel u. Seidenindustrie. 8vo., pp. 104. Map and 7 plates. Zürich, 1874. 12s.

GIRARD DE RIALLE. Instructions anthropologiques pour l'Asie centrale, rapport présenté à la société d'anthropologie dans la séance du 2 Juillet, 1874. 8vo., pp. 46. Paris, 1874.

MACGAHAN (J. A.) Campaigning on the Oxus, and the Fall of Khiva. 8vo., 2nd edition. London, 1874. 18s.

JACOLLIOT (L.) Les moeurs et les femmes de l'extrême Orient. Voyage au Pays des Perles. Illustrated. 18mo., pp. 352. Paris, 1874. 3s. 4d.

MANNING (Rev. Sam.) Those Holy Fields: Palestine illustrated by pen and pencil. 8vo., pp. 222. London, 1874. 8s.

GATH to the Cedars: Experiences of Travel in the Holy Land, by S. H. K. Illlustrated. 8vo., pp. 390. London, 1874. 5s.

AFRICA.

ROHLFS (G.) Quer durch Afrika. Reise von dem Mittelmeer nach dem Tschadsee u. zum Golf von Guinea. Vol. I., 8vo., pp. 362. Map. Leipsiz, 1874. 7s.

AMERICA.

HORETZKY (Ch.) Canada on the Pacific, being an account of a journey from Edmonton to the Pacific. 8vo. London, 1874. 5s.

ANNUAL REPORT of the Chief of the Bureau of Statistics on the commerce and navigation of the United States for the fiscal year ended June the 30th, 1873. 8vo., pp. 984. Washington, 1874. 21s.

ANNUAL REPORT on the State of the finances to the 43 Congress, 1st Session, December, 1872. By W. A. Richardson. 8vo., pp. 280. Washington, 1873. 14s.

GEOLOGICAL and Geographical Survey of the Territories of the United States. F. V. Hayden, United States Geologist in charge. Bulletins No. 1 and 2, pp. 106, 4s. Miscellaneous publications No. 4 (Synopsis of the flora of Colorada), pp. 180. 5s. Miscellaneous publication No. 5 (Descriptive catalogue of Photography). pp. 84. 3s.

Cartography.

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Indian Maps.

THE last parcel of maps received from India clearly proves that Colonel Thuillier is pushing forward the publication of the surveys with unabated energy. There are not wanting instances in which the results of a season's field work are published within a twelvemonth of its completion. This speedy publication is highly to be commended, for a map, not accessible to the public, represents so much capital locked up without bearing interest. The longer it is withheld from publicity, the more will it deteriorate in value, for though the main features of a country may not change, this cannot be said of minor topographical details. Old maps, therefore, assume more or less the character of historical documents, and cannot be trusted for information respecting the present condition of a country. We are glad to find that the Government of India fully appreciates the value of good maps, and nothing would please us more than an increase in the funds placed at the disposal of the Surveyor-General, as well as at that of his able coadjutors, Colonel J. T. Walker, superintendent of the great Trigonometrical Survey, and Colonels J. E. Gastrell, F. J. B. Priestley, and W. C. Anderson, of the Revenue Surveys, in order to enable these officers to make even more rapid progress than they have done hitherto, and that as little as possible of what we can perform ourselves may be left to be accomplished by posterity.

It is our pleasant duty to record the publication of thirty-two sheets of one-inch Topographical and Revenue Maps, in addition to a variety of others on a larger or smaller scale. The Trigonometrical Survey Office furnishes two new sheets of the map of Guzerat, and four (with hills) of that of Kumaon and Ghurwal, all resulting from surveys made in 1872-73, Major C. T. Haig being in charge of those carried on in Guzerat, and Lieutenant J. Hill in charge of the surveying party stationed in Kumaon.*

None of the new topographical survey maps† call for particular notice, and we will therefore confine ourselves to mentioning the officers to whose labours we are indebted for them, and the years in which the surveys were made. The two sheets of Chota Nagpore are from surveys made by Captain G. C. Depree, as far back as 1863-4. The sheets of Simla and Jutog are by Captain G. Strahan (1872-3), and two editions of the map have been photozincographed from the same original. It is to be completed in twenty sheets, of which thirteen have now been published. The four new sheets of Rajpootana are from surveys by Capt. G. Strahan, 1870-73, those of

* Great Trigonometrical Survey of India. Guzerat. Scale 1 m. = 1 inch. Sheets 8 and 9. Dehra Doon, 1874. 3s. each.

Great Trigonometrical Survey of India. Kumaon and Ghurwal. Scale 1 mile = 1 inch. Skeleton sheets 32 and 34, sheets 25, 26, 33 and 34 with hills. Dehra Doon, 1874. 3s. each.

† Chota and Nagpore Topographical Survey. Scale 1 m. = 1 inch. Sheets 12 and 13. Calcutta 1874. 2s. each.

Topographical Survey of India. Simla and Jutog. Scale 16 inches = 1 mile. Sheets 6, 7, 12 and 16. Calcutta, 1874. 2s. each.

The same map, scale 24 inch = 1 mile. Same sheets. 3s. each.

Preliminary Index to the sheets of the Topographical Survey of Simla. Scale 3 inch = 1 mile.

Rajpootana Topographical Survey. Scale 1 m. = 1 inch. Sheets 39, 44, 48, 49. Calcutta, 1874. 2s. each.

Bhopal and Malwa Topographical Survey. Scale 1 m. = 1 in. Sheeis 10, 12, 14 and 16. Calcutta, 1874. 2s. each.

Bhopal and environs. Scale 6 inch = 1 mile. 2 sheets. Calcutta, 1874.

The same map, 12 in. = 1 mile. Calcutta, 1874.

Ganjam and Orissa Topographical Survey. Scale 1 m. = 1 in. Sheets 34, 35, 36, 37, 68, 84 and 86 of the old series. Calcutta, 1874. 2s. each.

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Bhopal and Malwa are by Capt. R. N. Riddell, 1872-3 (who likewise supplies us with a plan of the environs of Bhopal), and those of Ganjam and Orissa by Lieutenant-Colonel G. H. Saxton, Captain G. C. Depree, and Mr. J. Dyer, 1856-65. The delay in the publication of the latter can be explained, no doubt as arising from exceptional circumstances.

The Revenue Survey Maps are more numerous than usual, and include some fine specimens of photozincography. The officers of the North-West Provinces Revenue Survey* supply us with the new sheets of the one-inch map of Bijnour, surveyed in 1868-70, by Major A. D. Vanrenen, and with a plan of Nynee Tal, and environs, surveyed by J. Campbell and G. H. Cooke. This plan is exceedingly minute. Some idea of the nature of the country delineated may be gathered from the fact that, in order to get from the "Cart Bridge" to the "Cemetery" above, it is necessary to travel some 8 miles by road, although the direct distance between these two places is less than half a mile. The existence of features such as this would hardly be expected if we trusted to the delineation of the ground in forming our ideas of the nature of the country, and we are decidedly of opinion that in maps, drawn on so large a scale, and referring to a country presenting such differences of level, equidistant contours, or at all events a large number of altitudes ought to be inserted if they are fully to answer the purpose for which they are intended. The hill shading, in its present state, is only calculated to mislead.

The new sheet of the map of Oudh is by Major F. C. Anderson (1870-1).† The officers of the Panjáb Survey‡ supply us with a capital plan of the cantonment and environs of Mooltan, in two editions, both photozincographed from the same original. Proceeding to the Central Provinces§ we meet with a new map of Bhundara, in five sheets, and with three sheets of the map of Chanda, both from surveys by Captain F. Coddington (1867-71). There are, besides, plans of the cities of Hoshungabad and Dumoh, the former surveyed in 1863-4, the latter in 1864-5, and a very neat and handy map of the district of Dumoh, reduced from the Revenue Surveys to a scale of 4 miles to the inch.

From Bombay we have received a new edition of Colonel Laughton's plan of Bombay, first published in 1866, and two new sheets of the map of Sind, surveyed, in 1868-9, by Captain D. Macdonald, who still moves amongst the interminable ranges of sandhills, where we left him last.¶

We have likewise received for the first time a number of maps resulting from the Madras Revenue Survey, which has been in progress since 1857, under the superintendence of Colonel Priestley. This survey, like that of the rest of India, is based upon the great triangulation, a circumstance for which we are mainly indebted to the earnest remonstrances of Colonel Thuillier, who succeeded in convincing the Board of Revenue that a map of permanent scientific value could be produced only in this manner, and that the additional expense involved by following his advice would be comparatively trifling. The survey has been carried on without interruption since the date mentioned, and out of twenty districts, four (viz., Nellore, Madras, Trichinopoli, and Tinnevelly), have now been surveyed completely or nearly so, whilst in eleven others more or less progress has been made.

Government villages are surveyed on a scale of 16 inches, Zemindari villages on that of 4 inches to the mile, and the plans, together with area books and other information respecting the nature of the land, which enables the revenue officers to make fair and just assessments, are published on the original scale. The village plans are combined into Taluk maps, on a scale of 1 mile to the inch, and the latter into district maps on half that scale.

The village plans are plain and unpretending in appearance, but fully answer the cadastral purposes for which they are intended.

The system of publishing them on an uniform scale strikes us as being far preferable to the spasmodic publication of isolated cities and cantonments, on a variety of scales, frequently unnecessarily large, which prevails in Northern India.

The Taluk maps are produced by a photographic process, but the names are printed from type, which detracts largely from their appearance. In the production of district maps a more elaborate system of colour-printing is applied. The map of the district of Nellore,* now before us, is probably a fair type of that class of map. The outline is printed in grey, the roads in red, and the names, from type, in black. Towns and villages are classified according to their population, irrigated and unirrigated lands are distinguished, district roads and cart-tracks shown, and the orographical features are fairly attended to. We do not doubt for a moment that these Madras maps are as correct, and their value intrinsically as great, as that of the maps published at Calcutta, but they are certainly inferior to them as respects technical execution. There are, however, exceptions to the rule, and the map of Horoornoorakul (we adhere to the rather inconsistent spelling of the original) with parts of adjoining Taluks is undoubtedly a very pleasing specimen of colour-printing†

We now turn to maps on a smaller scale, amongst which the Indian Atlas‡ deservedly holds the first rank. It has been increased by three quarter-sheets since our last notice, that representing a portion of the Himalaya (64 S.W.) being a very fine specimen of hill engraving.

The sketch-map of India and that of the Bombay Presidency§ both on the same scale, must be looked upon as preliminary or rather temporary maps, which will be withdrawn as soon as more complete and satisfactory maps of this kind shall be ready for publication.

* North-West Provinces Revenue Survey. District Bijnour. Scale 1 m. = 1 inch. Sheets 2, 5 and 7. Calcutta, 1874. 3s. each.

North-West Provinces Revenue Survey. Cantonment and Settlement of Nynee Tal, 1872-3. Scale 6 inch = 1 mile. Calcutta, 1874.

The same map, 10 inch = 1 mile. 2 sheets. Calcutta, 1874.

† Oudh Revenue Survey. Scale 1 inch = 1 mile. Sheet 39. (District Gonda.) Calcutta, 1874. 3s.

‡ Punjab Revenue Survey. Cantonment, city and environs of Mooltan, 1871-72. Scale 6 inch = 1 mile. Calcutta, 1874.

The same, 12 inch = 1 mile. 10 sheets and index. Calcutta, 1874.

§ Central Provinces Revenue Survey. District Chanda. Scale 1 inch = 1 mile. Sheets 2, 3 E and 10. Calcutta, 1874. 3s. each.

Central Provinces Revenue Survey. District Bhundara (Pergunnahs Pertabgurh and a portion of Komptha Tehseel Sakolee). Scale 1 inch = 1 mile. 5 sheets. Calcutta, 1874.

Central Provinces Revenue Survey. District Dumoh. Scale 4 miles = 1 inch. Calcutta, 1874. 3s.

Central Provinces Revenue Survey. Civil Station, City and Cantonment of Hoshungabad. Scale 8 inch = 1 mile. Calcutta, 1874.

Central Provinces Revenue Survey. Civil Station and City of Dumoh. Scale 10 inches = 1 mile. Calcutta, 1874.

¶ Map of the southern portion of the island of Bombay, reduced from Colonel Laughton's general map of 1872, with subsequent alterations 1873. Scale 1 : 9600. Poona, 1874.

Sind Revenue Survey. Scale 1 mile = 1 inch. Sheets 80 and 81 (Oomerkot). Calcutta, 1874. 3s. each.

* Map of the Nellore District, reduced from the Revenue Survey Maps. Scale 2 miles = 1 in. Sheets 2, 3 and 6. Madras (Chepauk), 1873.

† Combined map of Horoornoordkul, and a portion of Madikeri-Haleri Nadu Merkara Taluk. 1 sheet. Scale 2 m. = 1 in. Madras (Chepauk), 1873.

‡ Indian Atlas. Scale 4 in. = 1 mile. Quarter-sheets 9 N.W., 64 S.W., and 128 N.E. Calcutta, 1874. 1s. 6d. each.

§ Sketch Map of India, showing political and revenue divisions. Scale 32 m. = 1 in. 6 sheets. 5th edition, with additions to January 1872. Calcutta, 1874. 12s.

Preliminary map of the Bombay Presidency, compiled from the latest materials, and from information furnished by the Bombay Revenue Survey and Settlement Department in the office of the Surveyor-General of India, December, 1873. Scale 32 m. = 1 in. Calcutta, 1874.

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The sketch-map of India, however, though rather rough looking, is stated to embody the results of all surveys up to date, and more than fulfils the promise held out by its title, for in addition to the political boundaries it gives the railways and numerous altitudes. Of really permanent value is the new map of Western Bengal* on a scale of 4 miles to the inch, which is based exclusively upon the revenue surveys. We hope the publication of this map, as well as of that of Eastern Bengal, will be pushed forward with due diligence, for, on account of its scale and its very ample detail, it is eminently calculated to meet the requirements of the public.

Two maps extending beyond the British boundary remain to be noticed. The first is described as trans-frontier map No. 9,† and contains the whole of Nepal and Sikkim, with a considerable portion of Tibet. The native explorations conducted by Major Montgomerie, up to 1872, as well as Dr. Wright's sketches of Nepal, E. T. Johnson's map of Sikkim, Captain Carter's sketches, and Dr. Hooker's map, have been embodied in it, but we cannot help thinking that if existing materials had been used more exhaustively, certain portions of it might have been made more complete. But even now it abounds in useful information, and affords the readiest means of gaining a cartographical knowledge of Nepal, whose ruler has hitherto excluded English surveying parties from his territories.

The last map to be noticed is one of the frontier districts of Assam,‡ to the E. of longitude 92° 30', and has been prepared for the use of the Duffla Expedition. The British territory is delineated fully, but the intelligence department has evidently not succeeded in gaining much information respecting the territory beyond it, which is almost a blank.

Map of the Turco-Persian Frontier.§

BOUNDARY disputes are amongst the most fertile sources of war, and the governments of Turkey and Persia are, therefore, deserving of credit for having listened to the advice of England and Russia, and referred their dispute to an international commission, which was charged not only with a definition of the boundary, but likewise with a survey of the country through which it passes. The commissioners appointed under the treaty of Erzerum (1847) were General Chirikof for Russia, Colonel Williams (afterwards Sir W. F. Williams of Kars) for England, Dervish Pasha for Turkey, and Mirza Jafer Khan for Persia. They were assisted by a staff of surveyors, Lieutenant Glascott, of the Royal Navy, undertaking to determine the astronomical positions, and three officers of the Russian Topographical Corps, MM. Proskurekof, Tsirikof, and Ogranovich, the detail survey. The commissioners began their labours on the Gulf of Persia, but it became evident, at the first meeting, when the possession of Mohammera and of some neighbouring islands led to a violent contention, that no settlement of the boundary could be arrived at, and the English and Russian Commissioners, therefore, applied to their governments for authorization to confine themselves to the survey of the country, and leave the definition of the boundary to some more auspicious occasion. The request was granted readily, and in the course of four years (1849-52), a strip of country extending from the Gulf of Persia to the foot of Mount Ararat, and covering an area of about 10,000 square miles, was carefully surveyed. In 1859 Lieut. Glascott and two draughtsmen were sent to St. Petersburg, the former to lay down his astronomical positions, the latter to copy the Russian surveys, a task which appears to have occupied them for no less than five years! The expenses of the survey, as far as they concern England, have been stated to amount to 54,000*l*, and it is therefore all the more to be regretted that the interesting map resulting from so considerable an expenditure should have been withheld for so many years from the scientific public. A photographic reduction of it was certainly communicated by the Russian Government to Professor Kiepert, some ten years ago, but it is only in consequence of its publication by the Ordnance Department, that the results of this international survey have become accessible to the geographical world at large.

The map now before us is elaborately printed in colours, but it is by no means a favourable specimen of chromo-lithography. The hills, which are drawn very faintly and by no means characteristically, are almost obliterated by some of the heavier tints, and some of these, even where they cover large areas, can hardly be identified. This defect might easily have been obviated by the use of symbols, or of tints selected with more judgment. The nomenclature of the map is in French, and we trust has been carefully revised by a competent scholar. The topographical details, irrespective of the hills, are most ample, and the extent of gardens, palm-groves, forests, pastures, &c., can be traced readily.

Grateful as we are for the publication of this map, we should like to see it supplemented by a report on the country which it delineates, and many portions of which have never been trodden by the foot of a European. Such a report, we understand, has been published by the Turkish Commissioners in 1862. It is highly spoken of by Dr. Mordtmann, and might possibly repay the labour of translating it.

De Bruyn's Map of Ancient Palestine.*

THIS is the third edition of a map first published in 1844. The author has carefully consulted the authorities within his reach, and it is hardly his fault if much of his work has already been superseded by the surveys conducted at the instance of the Palestine Exploration Fund. The map is very neatly engraved, and accompanied by explanatory *prolegomena*. The names of modern sites and places with which the ancient localities have been identified have not been inserted upon it, though the scale is sufficiently large for such a purpose. In a *disquisitio* appended to the prolegomena, the author discusses the site of Tarichea, and contends that it was to the north, and not to the south of Tiberias.

Geological Map of Western Australia.†

THE map before us extends to latitude 27° S. and longitude 120° E., and embodies the results of the geological surveys made up to June 1872, under the direction of Mr. Henry Y. L. Brown, the government geologist. Fourteen geological formations are distinguished by colours, mesozoic and metamorphic rocks predominating in the interior of the country.

E. G. RAVENSTEIN.

* Map of Western Bengal, compiled from the revenue surveys, based on the great triangulation in the Surveyor-General's Office. Scale 8 m. = 1 in. Sheets 12, 16, and 17. Calcutta, 1874.

† Great Trigonometrical Survey of India. Trans-frontier maps. Skeleton sheet 9. Scale 1 : 1,013,760. Calcutta, 1874. 4s.

‡ Part of the northern frontier of Assam, comprising portions of districts Darrang, Lakhimpur, and Sibsagar. Prepared for the use of the Duffla Expedition in the office of the Surveyor-General of India. Scale 4 in. = 1 m. Calcutta, 1874.

§ Map of the Turco-Persian Frontier, made by Russian and English officers in the years 1849-55, on the scale of 1 : 73,050, and reduced to the scale of 1 : 253,440, or 4 English miles to 1 inch, at the Ordnance Office, Southampton (Major-General Sir Henry James, Director), 1873.

* Palaestina ex veteris aevi monumentis ac recentiorum observationibus illustravit Marinus Didericus de Bruyn. Trajecti ad Rhenum, 1874. Scale 1 : 420.000.

† Map of part of the colony of West Australia, showing the progress of the geological survey from August 1870 to June 1872, by H. Y. L. Brown. Melbourne, 1873.

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The Arctic Expedition.—The following letter has been received from the Prime Minister, by the President of the Royal Geographical Society:—

"10, DOWNING STREET, WHITEHALL,
Nov. 17th, 1874.

"DEAR SIR HENRY RAWLINSON,—Her Majesty's Government have had under consideration the representations made by you on behalf of the Council of the Royal Geographical Society, the Council of the Royal Society, the British Association, and other eminent scientific bodies, in favour of a renewed expedition, under the conduct of Government, to explore the region of the North Pole; and I have the honour to inform you that, having carefully weighed the reasons set forth in support of such an expedition, the scientific advantages to be derived from it, its chances of success, as well as the importance of encouraging that spirit of maritime enterprise which has ever distinguished the English people, her Majesty's Government have determined to lose no time in organizing a suitable expedition for the purposes in view.—I remain, yours faithfully,

"B. DISRAELI.

"Major-General
SIR HENRY RAWLINSON, K.C.B."

The Arctic Seal and Whale Fishery.—The Arctic fleet, with the exception of the 'Arctic,' has now returned safely to Dundee after a singularly successful year. At the sealing last February and March, 577 tons of oil were obtained, being the yield from 46,252 seals. The most successful ship at the sealing was the 'Esquimaux' (Captain Yule); next the 'Arctic' (Captain Adams); and third, the 'Ravenscraig' (Captain Bannerman). They took 10,300, 9500, and 7800 seals respectively. The value of the sealing (a ton of oil being worth 35*l.*), was 20,195*l.*, besides the 46,252 skins, averaging 4*s.* 6*d.* each, or 10,406*l.* So that the total value of the seal-fishing for 1874 is 30,601*l.* The whale-fishing was still more valuable. The details are as follows:—

	Whales.	Tons of Oil.	Tons of Bone.
2. 'Active' (Capt. Fairweather)	25	160	9
4. 'Victor' (Capt. Denchars)	24	155	8
7. 'Esquimaux' (Capt. Yule)	16	135	6
1. 'Camperdown' (Capt. Gravill)	32	175	9
9. 'Narwhal' (Capt. M'Lennan)	8	95	5½
5. 'Polynia' (Capt. Kilgour)	18	155	8
6. 'Ravenscraig' (Capt. Bannerman)	16	130	6
3. 'Intrepid' (Capt. Soutar)	24	185	10
8. 'Erik' (Capt. Walker)	11	100	5
	174	1290	66½

The price of whale oil is 40*l.* a ton, and of bone 540*l.* a ton. At these prices the oil taken in 1874 is worth 51,600*l.*, and the bone 35,910*l.*, giving a total of 87,510*l.* For both the seal and whale fishing the financial result is therefore 118,111*l.* The following is the result of the whale fishing since 1865:—

	No. of Ships.	Oil.	Bone.
1865	7	630	30
1866	11	340	18
1867	11	20	—
1868	13	970	50
1869	10	140	7½
1870	6	760	40½
1871	8	1165	61½
1872	10	1010	54
1873	10	1352	69
1874	10	1290	66½

Last year Captain Adams, in the 'Arctic,' led the way down Prince Regent's Inlet to a fishing ground not visited before, and this year the whalers have penetrated even further, some of them having been south of the mouth of Bellot's Strait. Captain Kilgour, in the 'Polynia,' went up Lancaster Sound, and caught no fewer than ten whales near Cape York, at the entrance of Prince Regent's Inlet, between the 10th and 12th of July. On the 26th Captain Kilgour landed in Batty Bay, and discovered the cairn containing records, which were left there by Mr. Kennedy on August the 6th, 1852, when in command of Lady Franklin's search-vessel the 'Prince Albert.' The records, with a sledge, a stove, two ice-knives, and other articles found on the south side of the bay, where the 'Prince Albert' wintered, have been brought to Dundee. The records are in an excellent state of preservation. On August the 3rd the 'Polynia' reached Bellot Strait, and was made fast to the land-ice off Long Island, where several whales were seen. This was the first time that any whaler had penetrated so far down the Gulf of Boothia, and the 'Polynia' thus reached the furthest point attained by Sir Leopold McClintock, in the 'Fox,' in 1859. The 'Polynia' was beset off Cape Scoresby, and again at the entrance of Creswell Bay, where she was in considerable danger, and experienced some severe nips, which made it necessary to heel her over, in order to caulk the leaks, chiefly near the water-line. This was successfully done off Cape Kater, and the 'Polynia,' after an eventful and very successful cruise, arrived safely at Dundee in November.

The whole of the fleet, except the 'Esquimaux' and 'Active,' went down Prince Regent's Inlet, as far as Creswell Bay, where the ice came in upon them, and they were all severely nipped. The 'Ravenscraig,' commanded by Captain Bannerman, was beset for nearly three weeks, and was in great danger. This is the first time that Captain Bannerman has commanded a ship. He was first mate of the 'Arctic' last year, when Captain Markham was on board, who was struck by his energy and fine seamanlike qualities. We heartily congratulate this able young sailor on the very successful result of his first command. The 'Erik,' commanded by Captain Walker, among others, was beset in Creswell Bay, and drifted as far as abreast of Bellot Strait. The nips were so severe that she was several times lifted 3 or 4 feet out of the water. She got clear at the same time as the 'Polynia.' On the 25th of October, Peter Ramsay, of Kirkaldy, a seaman upwards of seventy years of age, died upon the 'Erik.' He had actually been fifty-six whaling voyages to the Arctic Regions.

Levelling between the Aral and Caspian Seas.—During the summer the Imperial Russian Geographical Society, and its Orenburg Section, organised a scientific expedition for taking a series of levels between the Aral and Caspian Seas, the expenses being defrayed by the Russian Government. We now learn, from M. A. Lomonosoff, F.R.G.S., the Assistant-Secretary of the Russian Geographical

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Society, that this expedition, commanded by Colonel Tillo, has accomplished the work that was entrusted to it, and returned to Orenburg in November. A preliminary computation of the observations places the sea of Aral about 250 feet above the Mertwi Kooltook Bay of the Caspian, or 165 feet above the level of the ocean. The respective heights of the Caspian and Aral were first obtained in 1826 by Colonel Berg, assisted by Messrs. Jagoskin, Anjou, and Duhamel. They placed the Aral Sea 117.6 feet above the Caspian. In 1858 M. Struve made a second measurement to determine the height of the Aral Sea above Orenburg, and calculated the height of Orenburg above the ocean level and the Caspian. His result made the Aral Sea 132 feet above the level of the ocean.

Trade of Northern Coast of Russia.—The German schooner 'Minerva' returned on the 26th of October to Cronstadt from a cruise in the White Sea, being the last of a fleet of fifteen vessels which have all visited the mouth of the Petchora River this season and have returned to Cronstadt, laden with timber. There were also two Dantzic, two British, and a Russian craft in quest of salmon, engaged in the same locality. These vessels are all schooners of strong build and shallow draught, the bar of the Petchora having barely two fathoms of water upon it. A German vessel grounded on it this last summer and was lost, though the crew and cargo were saved. From the reports of the skippers, this year seems to have been very favourable for ice navigation, and there has been an absence of violent storms which are generally common between the North Cape and the White Sea. Last year, on the other hand, drift-ice was met with in considerable quantities in July and August, and a German schooner, 'Ceres,' narrowly escaped being crushed between some lofty bergs.

Some fishermen settled at the mouth of the Petchora are talking of establishing a fishing station on Kalguyef Island, and there is a probability of its also being selected as a depôt for whalers by a Russian whaling association in Archangel. Attention has thus been drawn to it, and a recent number of the *Ausland* furnishes us with the information which has been acquired. The island itself is about 250 miles in circumference as far as could be ascertained by the time taken to travel round it. Most of the inlets and bays afford suitable anchorage, the water immediately off the coast averaging from 9 to 12 fathoms depth, except to the eastward, where is a huge sandbank, named Plaskiya Roschki. The interior of the island is unexplored, but known to be hilly, and to culminate into two mountains covered with Iceland moss. From the hills numerous streams, teeming with fish, flow down; the sea around swarms with cod and various other kinds of fish common to Arctic seas. Walrus, seals, and sea-cows are occasionally caught, but the fishermen prefer to wage an easier and more inglorious warfare against the wild geese, swans, eider and other ducks, which flock thither in vast numbers in spring time. The fattest and heaviest birds are driven into nets spread out to catch them, and they then fall easy victims. Ten men in the course of a month will thus bag about 2500 good-sized birds, some of which are generally retained for home consumption, the rest being exported. About seventy or eighty hunters and fishers, altogether, annually repair to the island of Kalguyef, some being Samoyedes from the Kanin-Nossor promontory. The yearly export to the Meser district has greatly increased, and now consists of about 71 cwt. of down feathers, half that amount of other feathers, and about 750 swans' plumages. A thorough exploration of the island would be by no means unproductive, as the interior is frequented by numbers of Arctic foxes, Polar bears, and reindeer.

The German Colonies in Palestine.—A body of German Protestant dissenters, who call themselves the "Templars," and have their chief seat in Würtemberg, have established a number of colonies in Palestine, which, to judge from a report lately published in the Augsburg *Allgemeine Zeitung*, enjoy a prosperity denied to the now abandoned American and German settlements.

The colony at Haifa, though only founded in September 1869, already numbers 300 members, who devote themselves chiefly to agricultural pursuits. About 17 acres on the slope of Mount Carmel have been converted into vineyards, and a terrace at the foot of the mountain has been planted with olive-trees. The colonists have purchased 300 acres of arable land near the village et-Tineh, 4 miles to the south of the town; and the grassland in the plain of Esdraelon supplied them last year with 60 loads of hay. The Governor of Damascus has promised to present them with 3000 acres of land, but has not yet done so. There is a congregational hall, which is also used as a school, a store, an hotel, and a windmill. The colony to the west of Yafa had 232 inhabitants in March last, amongst whom there were many masons, carpenters, smiths, and other mechanics. Most of the colonists inhabit the timber houses left by their American predecessors, but several stone houses have lately been erected. There are a church and school, a hospital, a flour and wood store, a grocery store, an hotel, a steam-mill, and a laundry, with washing-machines imported from Stuttgart.

The third colony, Sarona, lies about 5 miles to the north of Yafa, on a height not far from the sea. It contains already fourteen flat-roofed stone houses, one and two stories in height, and is abundantly supplied with water from draw-wells, 70 feet in depth. The space behind the congregational hall has been planted with 1200 acacias, eucalypti, and other trees, and it is proposed to create similar plantations to the west of the village. The colonists own 310 acres of land, 80 of which lie in the valley, and the sandy soil along the sea-shore is said to be particularly favourable to the growth of vines.

At Ramleh there are two Templar families, who manage an hotel and a treadmill, and at Jerusalem there are nine families, mostly mechanics.

The "Colonization Fund" had an income, in 1873, of 10,451*l.*, and its accumulated capital, resulting from the investments of the colonists, amounted to 12,722*l.* in the beginning of the present year.

Lieutenant Cameron.—We are informed, in a letter from Zanzibar, dated October 21st, that the country between Unyanyembe and the coast is in a very disturbed state, rendering communication difficult. The power of Mirambo, the negro insurgent, is increasing daily, and the Arabs are at their wits' end. No news has been received from Lieutenant Cameron since March 4th. There is, however, no cause for

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anxiety at present, as the disturbed state of the country would probably make it difficult for messengers to pass. If Cameron, as is not improbable, has penetrated into the Manyuema country, or passed on to the north of lake Tanganyika, we cannot expect to receive tidings of him for some time.

Mr. Stanley on the Rufiji.—In our number for August, p. 181, we gave an account of Captain Elton's expedition up the Rufiji River, accompanied by a naval surveyor, in which he completed a survey, and furnished full information respecting the trade. Mr. Stanley, who has been sent out by the proprietors of the *Daily Telegraph* and *New York Herald*, to write letters for those journals on the state of affairs on the east coast, and in the equatorial lake regions of Africa, has since visited the delta of the Rufiji, and ascended the river to Kisu, the point reached by Captain Elton. Mr. Stanley has collected much detailed information respecting the course of the river Rufiji, the slave trade, and the commercial prospects of the region it drains, which has been published in the *Daily Telegraph* of November 24.

A Bifurcation between the Danube and Rhine.—It has been noticed for many years past that some distance below Donaueschingen a portion of the water of the Danube was sucked up by the soil, the river continuing its course much reduced in size. The water thus abstracted was supposed to give rise to the source of the Aach, which rises beyond a range of limestone hills to the south, and discharges its waters into the Lake of Constance, and thus to the Rhine. Recently the formation of two large holes, or "swallows," has been noticed in the Danube, and the amount of water swallowed up by them was sufficiently large to deprive the mill-owners of Möhringen and Tuttlingen, lower down the river, of the necessary water power. They examined the spot on the 3rd of October last, and resolved to stop up the holes. But to this the mill-owners on the Aach object, and the legal proceedings threatened by them may possibly lead to a thorough investigation of this interesting phenomenon.

Exploration of the Peruvian Montañas.—A Commission composed of Major Ribera and Mr. Wertherman, an engineer in the service of Peru, has started to explore the rivers Chanchamayu, Perene, and Tambo, to ascertain if navigable communication is possible between Yquitos on the Amazon and the confluence of the Perene, 15 miles from the fort of San Ramon. Mr. Meiggs, with reference to the influence that such communication must have on the proposed lines of railway from the Oroya terminus, has aided the Commission very materially.

Colombia.—The Government of the nine United States of Colombia has formed a Statistical Department, with a view to the collection and diffusion of trustworthy information respecting the political situation and commercial movements. A review is to be issued by the department at Bogota periodically, and that for July has been published. It gives the area of the Republic at 455,000 square miles; and describes the principal topographical features as consisting of three great cordilleras of the Andes traversing the Republic from north to south through its whole length, and separating the valleys of the Atrato, the Cauca, and the Magdalena, all navigable by steamers. The Magdalena is the great fluvial highway for the five central States and those bordering on the Atlantic; and has had steam navigation for 160 leagues since 1852, eight to twelve boats running between Honda and Baranquilla, whence there is a railroad to the port of Savanilla (15 miles), constructed in 1871. The population of Colombia, according to the last census, in 1870, is 3,000,000. The revenue of the Republic, in 1873, was $4,000,000, of which $2,775,450 were derived from customs, and $799,213 from salt mines. The expenditure left a surplus of $850,000. The public debt amounts to $21,000,000. Foreign commerce was represented, in 1873, by $12,500,000 worth of imports, and $10,500,000 of exports; carried by 729 sailing vessels (46,697 tons) and 281 steamers (14,459 tons). The chief articles of export are gold and silver ($2,500,000), tobacco ($2,000,000), coffee ($1,900,000), bark ($1,800,000), hides ($500,000), indigo ($400,000), Panama hats ($260,000), cotton ($250,000), and india-rubber ($150,000).

It is twelve years since there has been a civil war in Colombia. The last was in 1862, which ended with the reorganization under the constitution of 1863, on a federal basis, each of the nine States having separate local legislatures. There is no State church, and complete liberty of conscience and worship for all creeds. Brigandage is, and always has been, unknown; nearly all the States have adopted trial by jury, and imprisonment for debt has been abolished.

The Austro-German Alpine Club held its annual meeting on the 28th of August last, at Kempten, when 121 delegates, representing 44 branch societies attended. It was resolved to publish a journal *(Mittheilungen)* in addition to the *year-book*, and to devote 284*l.* to the improvement of Alpine paths and the erection of houses of refuge. The next annual meeting will be held at Innsbruck.

The French Alpine Club held its first General Meeting on the 20th of this month. M. Cézanne presided, and M. Adolphe Joanne, the Vice-president, reported on the past progress of the Club, which, though only founded on the 2nd of April last, numbers already 320 members in Paris, and 300 more in the "sections" of Auvergne, the Upper Alps, the Dauphinée, Savoy, Lyons and the Vosges. The "Annuel," to be published in March, will contain narratives of extraordinary mountain ascents accomplished during last season, amongst which those of the Jungfrau by M. and Mad. Gamard, and by M. Georges Dévin, and of Mont Cervin by M. and Mad. Millot and by M. Dévin, will occupy a distinguished place, and the secretary hopes that these will go far to refute the opinions of those who deny to Frenchmen the quality of tourists and Alpine climbers.

SUN'S TRUE BEARING OR AZIMUTH TABLES.

WE are glad to announce that a continuation of Captain Burdwood's valuable Tables of the Sun's True Bearing or Azimuth, computed for intervals of four minutes, is in the press, and will shortly be published. This part will contain an explanation for using the tables in various languages, thus adding considerably to its value. It will be remembered that the tables already published embrace that part of the world between the 60th and 30th parallels of latitude. The continuation will complete the tables to the Equator, and will appear in precisely the same form as its predecessor. The work has been undertaken by Captain J. E. Davis, R.N., of the Hydrographic Department of the Admiralty, and Mr. Percy L. H. Davis, of the Nautical Almanac Office.

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Correspondence.

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BALA SAGUN AND KARAKORUM.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In reading the recent brochure of Professor V. Grigorief, "The Karakhanides in Maverannahr," a notice of Bala Sagun recalled to my mind the letter of Colonel Yule, in your number for August (p. 167).

The confusion of Bala Sagun with Karakorum seems to have arisen from a misquotation from D'Ohsson, *Histoire des Mongols*, by M. Semenof.

In one of the notes to his translation of Ritter, vol. ii., p. 264, he says: "The Muhammadan authors call this ancient capital of the Turks (*i.e.* Karakorum) Ordu-Balik or Belasagun (Balgassun), which, however, is only its title;" and quotes D'Ohsson, *Histoire des Mongols*, T. i., p. 76. D'Ohsson, however, says no such thing. On page 64 of vol. ii. he says, "*Il s'éleva bientôt une ville, que l'Empereur nomma* Ordou-Balik, *ou la ville d'Ordou, mais, qui fut plus connue sous le nom de Caracouroum*," while on page 442 of vol. i. he quotes from Juwaini, translating as follows:—"*Il se dirigea vers Bela-Sagoun, ville que les Mongols appellent aujourd'hui* Gou-Balic." M. Semenof seems to have confused the two passages.

The brochure of Professor Grigorief, of which I spoke, is a translation with notes of the 6th chapter of the 2nd part of the "History of Dynasties," or "Chronicle of the Chief Astrologer," written by the Dervish Akhmed-Effendi, the chief astrologer of the court of the Osmanli Sultan Muhammad IV., commonly known as Munedjim-Bashi (born about 1630 and died about 1701), of which a Turkish translation was made by Nedim-Effendi in 1719-29, and was published at Constantinople in 1868-9, in three volumes.

Munedjim-Bashi begins as follows:—

"Of the Khans of Turkistan.

"These khans claimed to be descended from Afrasiab. Twenty of them reigned in all. The capital of their dominions was at first the city of Balasagun, but afterwards Bukhara and Samarkand. They began to rule over Mavrennahr in the year 383 (993 A.D.), and their dynasty came to an end in 609 (1212). Their main possessions were:—1. *Bala Sagun*, which was their capital, situated at the beginning of the 7th climate in 102° of longitude and 48° of latitude, not far from Kashgar, and considered from of old the boundary city of Turkistan; 2. *Kashgar*, the capital of Turan, in the 6th climate, in 106° of longitude and 45° of latitude; it is also called *Ordukend*, and is the birthplace of several well-known scholars; 3. *Khotan*, in the most distant part of Turkistan, longitude 107° and latitude 42°; 4. *Karakorum;* 5. *Taraz;* 6. *Farab:* all three important cities."

Professor Grigorief, in his note, besides mentioning the position of Bala Sagun as given by Al-Biruni, quotes from Hadji Khalfa, in his *Jihán Numá* جهان نما (Constantinople edition 1147 of the Hejra, p. 367) the longitude as 101° and the latitude as 47½°.

Besides the passage from Juwaini, condensed by Colonel Yule, there is another passage (D'Ohsson i., 433) where mention is made of Buku-Khan, "who went westward from Ordu-Balik (Karakorum) until he arrived in Turkistan, where he saw a fine plain, well watered and with rich pastures; he established his residence there, and built there the city of Bala Sagun, that is now called Gou-Balik." Abul-Ghazi-Khan, writing much later, says, "There was at this epoch in the city of Bala Sagun a khan named Ilik, a man of feeble character. The Mongols call this city Ghou-Baliq (the good city). *Ghou* means good and *Baliq* city. In the environs of this city camped many Turks, principally Qanqli, who did not cease to pillage the country and destroy the harvests. ("Hist. des Mongols et des Tatares. trad. de Baron Desmaisons" vol. ii., p. 49.)

The geographer Moqaddasi (Sprenger's *Post u. Reise routen*, p. 19) places Bala Sagun in the district of Isbyjab, which is identified with the modern Tchimkent, and in his list it is mentioned near Myrkey (Merke). If Bala Sagun were somewhere near the valley of the Tehu it would correspond with the statement (D'Ohsson i., 167) that Gutchluk, having pillaged the treasure of the Gurkhan at Uzkend, during his absence on a campaign against Samarkand, wished to surprise Bala Sagun. From Uzkend to the valley of the Tehu there would be a straight and easy road through the mountains from Namangan to Aulié-ata (Taraz). At the same time the itineraries quoted by Sprenger, (p. 23) make the distance from Isbyjab to the capital of the Turkish Khan, which is presumably Bala Sagun, 75 farsangs, or, roughly, about 445 miles, which would bring that place into the valley of the Ili, as Colonel Yule suggests. Professor Grigorief also locates it in the valley of the Ili.

It is difficult to suppose that Bala Sagun is a corruption of the Mongol *balghasu*. It is evident from the Mongols calling the place Gou-balik, that Bala Sagun was not a Mongol name. It is more reasonable to suppose that Bala is the Persian *bala* or *baliand* (upper), and that the place was called Upper Sagun. In this case mention of the old town of Sagun must be sought for. EUGENE SCHUYLER.

ST. PETERSBURG, *October 28th*, 1874.

NOTE BY COLONEL YULE.

Mr. Schuyler having been good enough to send me the preceding letter to read, I take the opportunity of adding a note.

Juwaini's expression, as given by D'Ohsson, conveys to me the impression that the name *Gubalik* was given to the city by the Mongols *of the Chinghiz age*. *Balghasún* alone could not have been the earlier *name* of the city, meaning as it does merely "city"; but it might have been adopted and corrupted by foreigners not knowing its meaning, like *Stambúl* from εἰς την πολιν. It is curious that *Gubalik* does not occur, so far as I know, in any of the medieval narratives letters of missionaries, &c., but there is a possible trace of it in one of the maps by Andrea Bianco in W. Mark's Library (No. 12). This calls the Chaghatai division of the Mongol Empire "*Imp. de Medio i.e. seu* Cobalek."

If this is not a mere chance clerical error for *Armalek* (as Almalig was called by the Franks) it may indicate that Cobalek (or *Gubalik*) was the same as Almalik, which was the recognised capital of Chaghatai. The expression *Imperium de Medio* probably referred to the middle position of the Khans of Chaghatai between the Great Kaan in Cathay and the Ilkhans in Persia; and it occurs more clearly elsewhere as *Imperium Medium*. Some writers and geographers, however, thought they had here got hold of that slippery region *Media;* hence the Friar Pascal (1338) makes it into *Medorum* Imperium, and the author of the Catalan Map (1375) into *Medeia*.

Andrea Bianco's work is of A.D. 1436, but as usual much of it represents a state of things gone by.

PALERMO, *November 9th*, 1874. H. YULE.

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M. KHANIKOF'S IDENTIFICATION OF NAMES IN CLAVIJO.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—M. de Khanikof's identification of the names in Clavijo's journey, as given in your magazine for this month is very interesting and valuable; but there is one of them, *the first*, which it is not easy to accept. This is the identification of Clavijo's *Tagiguinea* with the *Dzaghanian* or *Chaghanian* of old Oriental geographers.

The description of this as "a country on the *left* bank of the Oxus" is no doubt a slip of the pen. Not only was Chaghanian, however, on the *right* of the Oxus, but all the indications that I can find remove it far from any part of that river approaching Andkhoi, where

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Clavijo introduces *Tagiguinea*. Moreover, I apprehend that Chaghanian, as the designation of an extensive province, belongs solely to an earlier age than that of Timur, though on this I speak with more diffidence.

The name *Chaghánián* is probably a plural, originally applied to a tribe, which has solidified into a singular applied to a territory. Probable instances of the same kind are very numerous on that frontier, *e.g.*, *Badakhshan*, *Wakhán*, *Talikán*, *Shignán*, &c., &c. The preservation of the terms *Badakhshi*, *Wákhi*, *Shigni*, as applied to natives, or to dialects of some of those regions, in preference to *Badakhsháni*, *Wakháni*, &c., seems to corroborate the suggestion. And in one of the oldest occurrences of the name *Chaghánián* it seems still to preserve its *Gentile* meaning. This is in a quotation from the historian Beladhori made by M. Garrez in the *Journal Asiatique* (Ser. vi., Tom. xiii., p. 179). In the year (A.D.) 650-651 the Arabs, in prosecuting the conquest of Khorasan, came into collision with the Hayátilah or Ephthalites. The Persians and Hayátilah together defending Talikan,* received succour "from the Saghanián and the Turks." This no doubt was on the south of the Oxus, but we must believe that the Saghanián, like the Turks, had come from the north bank of the river. For in a slightly earlier record, that of the Chinese traveller Hwen Tsang, we find the Chaghánián territory *(Chi-go-yan-na)* placed east of the province of *(Ta-mi)* Termedh, and west of *(Ho-lu-mo)* Garma or Karategin, and of Shumán, which appears to be part of modern Kuláb. This makes Chaghánián to correspond with the modern Hissár territory, perhaps excluding the part on the Oxus, which seems to be the *Kio-ho-yan-na* of the Chinese traveller, = Kúvádián. This agrees also with the position indicated in the geographers used by Professor Sprenger in his *Post und Reise Routen* (see especially p. 21 and map No. 5), only in these both Shúmán and Kúvádián are comprehended in Chaghánián. But there is no apparent extension westward, to bring us near Andkhoi.

As regards the obsolescence of the name, to prove *that* is of the nature of proving a negative, and is not easy. My strong conviction is that the name does not occur as that of a considerable territory during or after the time of the Mongol invasion. My impressions are, however, dependent on translated authorities; and if they are ill-founded, M. de Khanikof will readily correct them. The name occurs in Baber. *(English Transl.* 60, 61; *French Transl.* i., 121, 122†), but only as that of a single town or fortress. From this town Baber's unruly comrade Báki Chagháníáni no doubt took his surname.

Though thus compelled to make strong objection to the identification of *Tagiguinea* with *Chághánian* or *Jaghánián*, it by no means follows that I can suggest a satisfactory identification; a thing I have often tried without success. At one time it appeared to me probable that it was *Juzgána*. This region *did* sometimes embrace Andkoi (see *Ibn Haukal* in *J. As. Soc. Bengal*, xxii., p. 161), and the name did continue at least to A.D. 1300, for Hammer quotes it from Wassáf, (H. writes *Dschusgánet*, *Ilchan* ii., 98‡) as in contemporary use. But I confess that the resemblance of names is not close enough to be satisfactory; and some derivative of *Tájik* or of *Táj* seems more probable.

PALERMO, *November 16th*, 1874. H. YULE.

* M. Garrez himself supposes *Talikán* to be a plural of the name of the *Hayátilah*, whose name appears in an old Armenian history as *Italakan*.

† M. Pavet de Courteille might have taken the trouble to give us an index to his Baber. The want of that was probably a much greater defect in Erskine's admirable book than a few petty faults of translation.

‡ The list in Wassaf, of places overrun in 1300 by Kotlogh Shah, the Chaghátaian chief, embraces another of M. de Khanikof's identifications. It runs: Shibrghán, Juzghána, Badakhshán, Kishm, Taikán, Dara-i-Yúsuf, Darà-i-Gaz, Firuz-Kuh *'Alí-ábád*, Malikábád, Merv, with its dependencies *Andkhoi*, Faryáb, Talikán, Merv-chak, Panj-deh.

Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

November 10, 1874.

PRESIDENT'S ADDRESS.

THE PRESIDENT, Sir Henry Rawlinson, took the chair at 8.30 P.M. Among those present were H.R.H. the Duke of Edinburgh, H.I.H. the Czarewitch; Count Beust, the Austrian Ambassador; Baron Hochschild, the Swedish Minister; Lord Houghton, Mr. Ward Hunt, Sir Alexander Milne, Admiral Sir Edward Belcher, Admiral Hornby, Admiral Richards, Sir George Campbell, Sir Bartle Frere, Admiral Collinson, Captain Evans, R.N.; Sir Leopold McClintock, Captain A. H. Markham, R.N.; Captain E. Stubbs, R.N.; Lieutenants Jeffreys, W. H. May, Rawson, and Arbuthnot, R.N., and Mr. Allen Young.

The PRESIDENT in his opening Address dealt at some length with the proceedings of the Geographical Section at the recent meeting of the British Association. Speaking of Arctic discovery, he said it was undoubtedly the most prominent geographical question of the day. The subject was fairly ventilated at the meeting of the British Association, where, besides listening to the interesting and instructive remarks of the President, the geographical section had the advantage of hearing an excellent paper by Admiral Sherard Osborn, on "Routes to the North Pole," Since then, however, all Europe has been aroused by the intelligence of the return of the Austrian Arctic Expedition, after being lost to sight for more than two years in the ice-bound regions of the Pole. This expedition, under Lieutenant Weyprecht of the Navy, and Lieutenant Payer of the Engineers, both experienced Arctic explorers, was prepared and supported partly by public subscription, and partly at the expense of Count Wilczek, who also accompanied it in the chartered yacht 'Isbjörn,' as far as Barent's Island, off Novaya Zemlya. The party were embarked on board the schooner 'Admiral Tegetthoff,' and left Barent's Island for the North, in August 1872. Very shortly afterwards the vessel was caught in the ice, and drifted with it, according to the currents, sometimes to the north-east, and sometimes to the north-west, till, after fourteen months of continued danger and anxiety, the floe in which the 'Tegetthoff' was fixed, joined the land ice in latitude 78° 51′ N., and longitude 59° E. The winter was passed off this land, which was called after the Emperor, "Franz Joseph Land," and in the following spring—that is, in March and April of the present year—Lieutenant Payer explored the coast in sledges as high as 82° 5′ (within 40′ of Parry's furthest), and from this point observed land up to 83°, which was named Cape Wien, and which, if we except certain doubtful reports of American discovery, is the land nearest to the Pole that has yet been sighted on the face of the earth. The gallant officer to whom is due the merit of this great discovery is here to-day to recount his adventures, and to receive your marks of approval, having come from Vienna expressly to attend the opening meeting of our Society. He will explain how the expedition was obliged, on the 20th of May of the present year, to abandon the 'Tegetthoff,' and endeavour, with their sledge-boats, to reach Novaya Zemlya, which island, after incurring extreme dangers, they reached in a three months' journey, and from thence they were conveyed in a Russian vessel to Norway. Of all the interesting questions that will arise for consideration out of this long detention in the Arctic regions, the most important will probably be an attempt to ascertain whether the direction and duration of the currents which carried the 'Tegetthoff' with some fluctuation of longi-

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tude, over five degrees of latitude to the north, were due to tidal influences or to physical causes connected with the distribution of ice, open sea, and land at the Pole. One result of this Austrian expedition is, at any rate, quite clear. It proves the absolute impossibility of reaching the Pole, *viâ* Spitzbergen, by sea, and thus furnishes an additional argument in favour of the route by Smith Sound, which the Royal Geographical Society have always advocated as the one most likely to afford access free of ice to a very high northern latitude. It is quite possible, however, that sledge journeys may be made along Franz Joseph Land, and the adjoining coasts, very much in advance of Payer's furthest; and it is understood that another Austrian expedition is now being organised for the purpose of thus extending and completing the line of discovery along this track so auspiciously commenced.

Having expressed regret that the British Government had not yet consented to send an Arctic expedition *viâ* Smith's Sound, Sir Henry went on to say: In Central Africa, since Livingstone's death, there has been a lull which contrasts strangely with the former activity. Cameron, who proceeded to Ujiji at the close of last year, and who there succeeded in recovering Livingstone's diary and map of his journey in 1866 from the sea-coast to lake Nyassa, without which the account of his travels now in the press could not have been completed, is understood to have been since navigating Lake Tanganyika, and it is to be hoped he will thus have had an opportunity not only of re-examining the northern end of the lake, with a view to the settlement of the hydrographical question which is in dispute between Livingstone and Stanley on the one side and Baker and Findlay on the other, as to the connection of Tanganyika with the Albert N'yanza, but also of determining positively whether there is any exit for the waters of the former lake through the Kabogo Mountains into the Lualaba, or on the eastern side through the Rufiji River to the sea. No direct intelligence, however, has been received from Cameron since the month of July; and it is quite possible, therefore, that ere this he may have obeyed the recall of the Society, which was forwarded to him from Zanzibar in April last, when the Society, having already disbursed from its own resources, on the Relief and Search Expedition, £2,300, in addition to the fund subscribed for the purpose by the public, decided that it could no longer sustain the expense of an independent exploration. At any rate, whatever may be the present aspect of the so-called Relief Expedition, it is gratifying to me to be able to record that a liberal public, in token of their sustained interest in Central African discovery, have recently, in answer to an appeal from Cameron's friends, subscribed another thousand pounds, in order to help him through his difficulties, and enable him to do justice to the work he is engaged on.

The indefatigable Mr. Stanley, also, is leading an independent expedition into Central Africa, at the expense of the proprietors of the *Daily Telegraph* and the *New York Herald*, who are already favourably known in their respective capacities as munificent patrons of research—the English journalists have recently sent Mr. G. Smith to excavate the ruins of Nineveh, while the American house supplied the necessary funds in 1871 for the discovery and relief of Livingstone. Mr. Stanley, accompanied by four Europeans, and well furnished with arms and other appurtenances of travel, had reached Zanzibar by the last accounts, and was preparing to start for the interior. It is believed that his main object is to supplement the labours of Livingstone, and it is thus supposed that he will direct his steps in the first instance to the so-called fountains of Herodotus, which lured our own hero traveller to his death; returning thence to the Katanga mines and the subterranean dwellings at Rua, and afterwards passing on to the Lualaba, and possibly to the nameless Equatorial Lake. The Geographical Society has no relations with Mr. Stanley, either direct or indirect; but admiring, as we do, his energy and address, and deeply interested, as we are, in the solution of the problems he has taken in hand, we naturally follow his footsteps with sympathetic and eager expectancy.

Then followed a survey of geographical progress in other parts of Africa and Asia, especial reference being made to the Russian surveys in Central Asia, and an indication of the more interesting papers which would be brought before the Society during the current session.

The PRESIDENT introduced Lieutenant Payer to the meeting, with a brief summary of what has been done by foreign nations in the way of Arctic exploration since our efforts relaxed, and a renewed expression of the regret felt by the members of the Society, and by the country at large, at our not undertaking, by means of a Government expedition, the task of reaching the North Pole. He announced that Lieutenant Payer's paper, which was written in German, had been translated at very short notice by Mr. Ravenstein, and that it would be read by the secretary.

THE AUSTRO-HUNGARIAN EXPEDITION.

Mr. CLEMENTS MARKHAM read Lieutenant Payer's paper, which was a lengthened and interesting account, in detail, of the facts stated in the President's Address. This paper, printed *in extenso*, forms our second article (p. 358), to which we beg to refer our readers.

Lieutenant PAYER, in a short explanatory address, said that when they abandoned the 'Tegetthoff' their equipment was of the simplest, for circumstances forbade anything approaching to luxury, and in addition to the clothes he wore upon his back, the personal property of each member of the expedition was limited to a blanket to sleep in. The provisions, ammunition, &c., for three or four months were packed in three, subsequently four boats, placed on sleighs, and in three large sledges, each weighing about 17½ cwts. Only the two strongest of the dogs were alive by that time, but even this small contingent proved of great service, for they pulled daily 9 to 10 cwts. between them. The deep snow which was encountered on first starting, compelled them to travel as many as five times over certain distances, for it required the united strength of the whole party to drag a single sledge or boat. Having reached the edge of the land ice they had to clamber with the boats and sledges from floe to floe, and sometimes to cross narrow fissures in the ice. Persistent southerly winds, moreover, destroyed the little progress they made, for they drove the ice, upon the surface of which they were travelling, to the north, and after two months of incessant labour they were not more than 8 miles from the ship. It almost appeared to them as if their struggle with the ice would end in a defeat, which would compel them to remain a third winter in their ship, uncheered by a ray of hope.

The ice around them was closely packed, and on several occasions they were compelled to lie quietly with their boats upon a floe of ice for an entire week, until it should please some channel to open. Northerly winds set in at length, on the 15th of July, which dispersed the ice to some extent, continuous rains reduced its dimensions, and by almost superhuman exertions they advanced 10 miles in the course of as many days. They were fully convinced by this time that no vessel would have succeeded in that year to reach the land discovered by them.

On the 7th of August they observed for the first time a swell, coming from the south, and indicative of the proximity of open water. This revived their sunken hopes, which fell anew when they again became ice-bound for the space of five days; but on the 14th of August they reached the edge of the pack, in latitude 77° 40' N., and their safety seemed thus to be secured. Here they were reluctantly forced to abandon their sledges, and to kill the dogs, who had been their faithful companions and assistants in times of need, for the boats were hardly large enough to hold themselves and baggage, besides

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which they were without water and provisions for their maintenance.

Their final salvation was due entirely to their finding the edge of the pack-ice in so high a latitude. Favoured by the weather they crossed the open sea in the direction of Novaya Zemlya, and followed the coast of that island towards the south. On the 18th of August they for the first time placed their feet upon *terra firma*, near the Admiralty Peninsula, and in the evening of the 24th—that is, after a passage of 96 days—they found themselves in the bay of Downs (latitude 72° 40'), on board the Russian schooner, 'Nikolai,' Captain Feodor Voronin, who received them with that heartiness which distinguishes the Russian people.

A speedy passage brought them to Vardö, and at 3 o'clock in the afternoon of the 3rd of September, 1874, they stepped upon the hospitable soil of Norway, full of that satisfaction which an escape from a position of danger and doubts brings with it.

The PRESIDENT then read extracts from a letter written by the German geographer, Dr. Augustus Petermann, of Gotha, which expressed a hope that the British Government would sanction an Arctic expedition, and again take the lead in this interesting exploration.

Admiral Sir E. BELCHER, who proposed a vote of thanks to Lieutenant Payer, expressed a decided opinion, based on his own experience, that such an expedition, if left untrammelled, to be conducted according to the judgment of one of the many officers we had who were competent for the work, might accomplish the task by way of Smith Sound in three years.

Admiral COLLINSON, who seconded the vote of thanks, referred to the fact—established by the 'Tegetthoff's' voyage—of there being a northern current to the east of Greenland, while the efforts of English explorers, *viâ* Baffin's Bay, had often been rendered nugatory by a southern set, as a matter which would have to be very carefully considered, as indicating a change in the ocean drift of the Polar Seas.

At the invitation of the President,

Count BEUST offered a few remarks, expressing his sensibility of the honour which had been done Lieutenant Payer and his brave companions by the Royal Geographical Society, and returning thanks in the name of the country he represented, to which, he said, such a tribute to two deserving young officers would be most gratifying. Making some amusing references to the affinity between science and diplomacy, he said there was, however, this difference, that while humanity rejoiced at every new discovery of science, they generally felt uncomfortable on hearing of things being discovered by diplomacy. He claimed to have made one discovery himself, though that had not the merit of novelty—namely, the warm sympathy and generous appreciation by Englishmen of every honourable achievement of a foreigner.

The resolution being unanimously carried,

Lieutenant PAYER expressed his warm thanks for the honour which had been done him by the invitation sent by the Royal Geographical Society to appear before so brilliant an assembly on the occasion of the opening of the session.

November 23rd, 1874.

WARBURTON'S JOURNEY ACROSS AUSTRALIA.

SIR HENRY RAWLINSON, the President, took the chair at 8.30 P.M. Among those present were Admiral Sir Alexander Milne, Sir Charles Nicholson, Sir Rutherford Alcock, Sir George Campbell, Sir Frederick Arrow, Admiral Sherard Osborn, Colonel P. Egerton Warburton, Mr. Galton, Mr. Allen Young, Lieutenant Payer, and Captain Hardinge, R.N.

The PRESIDENT read the letter from Mr. Disraeli announcing the determination of the Government to despatch an Arctic Expedition next spring, which was warmly applauded. Sir Rutherford Alcock then proposed, and Admiral Sherard Osborn seconded, a cordial vote of thanks to the President for his successful exertions in furthering the cause of Arctic exploration.

It was announced that news had been received from Colonel Gordon at Gondokoro up to the 5th of September. The sections of the steamer were then at Mount Regiaf, below the falls, and it was expected that they would be above the falls and that the steamer would be put together, and ready to enter the Albert Nyanza, in a fortnight from that time.

Sir HENRY RAWLINSON announced that the paper of the evening would be an account of Colonel P. Egerton Warburton's remarkable exploring journey across Australia from Alice Springs to the west coast; and, in introducing Colonel Warburton to the meeting, Sir Henry mentioned that his admirable work had obtained for him the gold medal of the Society. Nine gold medallists had obtained that honour for exploring work in Australia. First came Governor Eyre in 1843, then Count Strzelecki, Charles Sturt, and Dr. Leichardt, A. Gregory in 1857, McDougall Stewart—the first to explore the telegraph line—in 1861, O'Hara Borke in 1862, Frank Gregory in 1863, and Colonel Warburton in 1874.

Colonel WARBURTON said that he felt sure that the presentation of the gold medal to him would act as an incentive to further exploration. Starting from Adelaide he proceeded, with camels, to Alice Springs, on the line of telegraph, a distance of 1100 miles, which he reached in December. On the 15th of April he started on his long journey to the westward. For the first 200 miles, along the McDougall range, there was pasture and water, but beyond nothing save spinifex grass and ridges of sand; a dreary and barely inhabitable waste.

Speaking of the inhabitants he said that they were afraid of the party, and that they were difficult to find. The explorers were anxious to catch them, in order that by keeping one without water, he might be compelled to show them where water was. Once they caught a girl, and tied her by the neck to a tree, but she gnawed through the rope and escaped, running off on tip-toe to prevent them from following her trail. These natives are the very lowest in the scale of humanity. They have no huts, and even no shelter but the shady side of a bush. As to clothing, the men pass the shank bone of a wallabee through their noses, and are in full dress. As for the dress of the women, Colonel Warburton could say nothing, as there is nothing to say.

No animals but camels could have taken the party, for there is not a blade of grass for hundreds of miles. The camels were most patient and easily managed, but it is necessary to have a master bull among them, to keep the younger ones in good order. Colonel Warburton and his party were obliged to eat seven of these camels, and, when worked until they cannot stand, their meat is tough and dry. A bucket of such meat never produced a single bubble of grease on the surface, and the taste was like the inside of a carpenter's glue-pot. They were driven, by absolute starvation to such food. The party took six months' provisions, but the journey lasted nine months, and latterly they had no flour, tea, salt or sugar; nothing but camel meat scraped off the bones, and dried in strips on bushes.

Finally, they had to make a rush for the Oakover River, a distance of 160 miles. It was neck or nothing. If the camels could not do it they were lost. When they reached the river it was dry, and they were unable to go further. There were only two camels left, and none of the men could walk a hundred yards, while the nearest station was on the De Grey River, 150 miles further on. The two strongest of the party were sent on the remaining camels to look for the station and get help; while the rest waited for many days, gradually starving. At length, abundant help came from the station of Messrs. Grant, Harper, and Anderson, to whom the explorers owed their lives. They were made

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guests of the colony of West Australia, and were franked back to Adelaide.

Sir CHARLES NICHOLSON asked what was the character of the vegetation, and whether any localities could, in process of time, be made use of for purposes of pasture, notwithstanding the unpromising appearance of the country.

Colonel WARBURTON replied that a great part of the country south of Alice Springs is excellent pasture land, as well as to the north of the McDougall ranges, but that the region explored by him to the westward is high sandy land, which is never likely to be occupied. There is no grass, and no animals except the wallabees, which can do without water. The natives live on the wallabees, burning the spinifex grass, and knocking them on the head as they rush out. There is also an acacia with small, hard black seeds on which the natives feed, and some forests of fine casuarina trees. But, as a rule, the country consists of mere ridges of sand with intervening flats, without water, and uninhabitable.

In closing the meeting the thanks of the Society were voted to the Honourable Mr. Elder and Mr. Hughes, the supporters of the expedition, as well as to Colonel Warburton.

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THE DUTCH GEOGRAPHICAL SOCIETY.

THE fifth meeting of this Society was held at Rotterdam on the 20th of last June; the Patron, Prince Henry of the Netherlands, being present. The number of members was reported to have increased to 435; and presentations of maps were acknowledged, including a set of the Indian atlas, and Colonel Walker's map of Turkistan, from the Geographical Department of the India Office.

The first paper, by Mr. J. K. J. de Jonge, was an account of the journey of Lycklama à Nyeholt to Persia in 1866, described in his work entitled *Voyage en Russie, au Caucase, et en Perse*. Mr. de Jonge also gave an interesting account of the history of commerce between Holland and Persia, of the foundation of Dutch factories at Ispahan and other places, of the flourishing state of this trade in the days of Abbas the Great, of its decline in 1722, and how, in 1765, it had ceased to exist. Mr. de Jonge suggested that this would be a good time for attempting to resume commercial intercourse between Holland and Persia, by means of steamers touching at Máskat, Aden, and Jeddah.

The second paper was on the proposed exploring expedition to the east coast of Sumatra by W. F. Versteeg. This undertaking was first suggested by F. de Casembroot. Some parts of Palembang are still very little known, as well as the districts of Jambi and Korintji, and it is believed that the river Jambi flows through a rich country the examination of which will yield most valuable results. The reading of the paper was followed by a discussion, in the course of which Prince Henry said that the Government would assist the Society in organizing the proposed expedition. Mr. A. J. Ten Brink spoke on the past and future of the Banda group, and described the principal islands.

The present number of the *Proceedings* (No. 3) was issued in October. Besides the report of the meeting of June 20th, it contains a very complete and interesting history of the expeditions of Miss Tinné, by N. W. Posthumus, illustrated by two maps; and a notice by Mr. J. P. Amersfoordt of Jan Pieterszoon Dou, one of the leading hydraulic engineers of Holland in the days of Prince Maurice (he died 1635).

Professor Veth has delivered the second part of his exhaustive review of the progress of geographical knowledge and discovery in all parts of the world, which also appears in this number. The first part of this address had been delivered on the 11th of April. Professor Veth not only touched upon the progress of all exploring expeditions, but reviewed every geographical publication of importance that has recently appeared.

Among the communications, in this number, is the announcement of the discovery of a new island, about a mile and a half in length and covered with vegetation, by the Dutch steamer 'Hertog Bernard,' in the present year. The island is 15 miles west of the island of Simo, in 97° 36′ E. longitude, and 0° 2′ S. latitude; and is not to be found on any map. The number concludes with an account of the discoveries of the Austro-Hungarian Arctic Expedition.

M. M.

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FRENCH GEOGRAPHICAL SOCIETY.

Bulletin for June.

THE June *Bulletin* opens with a description of Dahomey by Abbé Bouche, who cites several commercial products of this region, such as sugar-cane, cotton, caoutchouc, indigo and other dyes, palm-nuts and oil, as of themselves sufficing to give great importance to any scheme for acquiring a better knowledge of the country. Lagos, Badagry, Porto Novo, and Appi are the best *points d'appui* for interior exploration, and it is from hence that one stands the best chance of meeting the caravans which come from Marocco, Tunis, Tripoli, and Egypt, in quest of cotton, copper, iron, gum-arabic, ivory, and silver. There is a great mass of information—much more than is generally imagined—the Abbé thinks, in existence respecting this part of Africa, and he consequently proposes soon to compile a history of the country from the 17th century, that is a little before the foundation of the kingdom of Dahomey, all the material for this being directly available from printed works in France. The Slave Coast is low and sandy, and studded with lagoons, and, as far as the 7th degree of latitude, is of very recent formation, being, in fact, mainly caused by the sand deposited by the Guinea current, and by the detritus brought down by rivers from the interior. The landscape is charming, and the country most productive, but the tillers of the ground are constantly being deprived of the fruit of their labour by the rapacity of their sovereigns. The population is much larger than is generally supposed, towns containing thirty, forty, and fifty thousand inhabitants being not rare, but the people are mostly scattered over the country in groups of two, three, or four houses, from which they can easily decamp in case of the approach of an enemy. The population is divided into two great clans or families—the Jejis and the Nagos, the former a savage and greedy race, numbering about two millions; the latter about four millions and who, by their gentle manners, hospitality, industry, and intelligence form a pleasing contrast to their neighbours. The language spoken by the Nagos is remarkable for the number of consonants used: the inhabitants of Dahomey speak the Jeji. But nearly all the various languages spoken on the coast are but dialects of the same mother tongue, and any traveller with a decent knowledge of Arabic and the Nagos tongue would find little difficulty in traversing the continent from Algiers across the desert by way of the Sudan and Nyfi to Lagos. The language spoken by the people of Yoruba to the north-east contains some Hebrew words. The Abbé Bouche mentions that he was the more surprised at this circumstance as El-Edrisi, an Arabian traveller of the 11th century, states that the country now occupied by the Nagos was in his time peopled by Jews, while des Marchais also states that at the beginning of the 17th century the negroes there practised several observances which savoured of Judaism. The local traditions relate that the first inhabitants of Yoruba came from a far country across the sea, and disembarked at Abbeokuta. If this be true, it must be dated very far back, as Abbeokuta is 50 miles from the coast, and the land must have taken a considerable time to gain upon the sea to that extent. The country between the Volta and the Benin formerly

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constituted the large kingdom of Ardres, the capital of which was Ardra or Allada. Towards the beginning of the 17th century, this sovereignty was split up into small states, which eventually became tributaries of the powerful empire of Nagos. In 1861 the English obtained the cession of the kingdom of Lagos on the coast, for an allowance of 1000*l.* per annum, and the following year acquired Palma and Leckie. Slavery then ceased along the coast line of the British possessions, and legitimate commerce sprung up. The value of business now done in Lagos alone exceeds one million sterling.

The Abbé Bouche describes the perilous crossing of the bar on the occasion of his visit to Lagos, and his reception at the hands of the French consular agent. Lagos is extremely unhealthy, and little wonder when we read that between one and two hundred yards from the merchants' houses is situated the burying-place, where the corpses are never interred deep for fear of starting water, which in Lagos is always found a few feet below the surface. The Abbé found the negroes rather spoilt by English rule than otherwise: compared with other inhabitants of the coast, they are arrogant and indolent.

From Lagos, the Abbé Bouche made his way by boat to Badagry along a species of natural canal which joins the coast lagoons, and thence on to Porto-Novo. The western portion of the canal or river here alluded to formerly did not exist; some Portuguese maps of the 16th century show that the Uellon River then discharged itself into the ocean where a narrow neck of land now intervenes, but that one night the river broke down the bar of sand which separated it from the marshes eastward, and has continued flowing in that direction ever since. Porto Novo is a place of some importance as the outlet of the trade of Yoruba and the interior states; the French partly recognized this in 1863, and established there a protectorate under Baron Didelot; but it was abandoned the following year, the English being thus left supreme on the coast. The Abbé concludes the narrative of his journey with a wish that France may again turn her attention to a country so richly gifted by nature as this portion of Africa.

The other articles are, an account of the Rio San Francisco and the Rio das Velhas, rivers of Brazil, by the Abbé Durand; a translation of a short account of the Khanate of Kokan and the surrounding regions, by the late M. Fedchenko, with notes thereon contributed by Colonel Yule; a letter from Dr. Schweinfurth to M. Duveyrier, on the great oasis of the Lybian Desert; and a short account by the French Consul-General at Valparaiso, on the colonization of the Magellan territory contiguous to the straits of the same name.

Bulletin for July.

THE July *Bulletin* opens with a notice by Captain de Contenson, of the inundations which for the last four years have been laying under water to the depth of between 3 and 5 feet, on an average 40,000 square kilometres, in the country around Tien-tsin. This part of China was formerly rich and prosperous, but its population is now terribly reduced by this calamity, for which no remedy has as yet been found. Some of the inhabitants have emigrated northward of the Great Wall, whither other agriculturalists, driven by the movements of the Yellow River, had settled down and converted an uninviting pasture land into vast tracts waving with wheat and oats. These movements of the Yellow River were primarily occasioned by political disorders, such as the Taiping and other rebellions, which interrupted the construction of dams and other works necessary to keep the stream in check. In consequence, in 1857, the great river burst its bounds just below the city of Kai-fung and changed its course from eastward to north-east, in which direction it has flowed ever since, discharging its waters into the Gulf of Petchili. But Captain de Contenson contends that it is not possible for the Hoang-Ho to occasion the Tien-tsin inundations, and adduces as his chief reason the facts that in 1868, Ney Elias found the Imperial Canal (the only channel along which the waters could flow into the Tien-tsin plains) almost dry, and the Hoang-Ho deepening its bed. He argues, on the other hand, the inundations cannot but be occasioned by the streams to the north of Tien-tsin, which descend from the Mongolian plateau and traverse a steep decline with sparse vegetation. Though in winter these streams are but a tiny thread, they increase enormously in volume from May to September, when the rains descend in torrents three or four times a week, and with all the more force on account of the scantiness of forests and vegetation, which in other regions serve to economize and distribute the downpour. Captain de Contenson's remedy for this evil is the construction of reservoirs to hold the summer rains and so equalize the supply of water to the streams, which might thus, he argues, become navigable. The construction of reservoirs would be an easy matter, any number of workmen being available at 2½*d.* a day.

The next article is a detailed description of the Rio-San-Francisco of Brazil, by the Abbé Durand, which in its turn is followed by a memorandum on a new topographical survey of the group of which Mont Blanc forms the centre, by M. Viollet le Duc, a paper originally read by the author before the Geographical Society on the 28th of March last. We find next a description of the new map of Mexico on the scale of 1:3,000,000, which has been prepared at the Dépôt de la Guerre by Staff-Captain Niox, from surveys executed on the spot by officers attached to the expeditionary force. A memoir on the recent triangulation of Corsica by Captain Perrier comes next. The captain points out that from 1770 to 1791 Franchot was engaged in executing a triangulation of the island, and that he united it to the coast of Tuscany by a series of forty-six triangles extending from Leghorn to Cape Argentale. In 1827 Durand, while engaged in triangulating between Marseilles, Aix, Castellane and Nice, descried the mountains of Corsica, and was able to unite his measurements to those of Franchot, by fixing Monte Cinto and Paglia Orba, which were no less than 195 and 267 kilometres distant respectively. The recent triangulation was commenced in 1863, and consists of sixty-five triangles of the first order, comprising a chain extending from Turghio-Carghese in the west and bifurcating thence to the north and south, and several supplementary triangles leading from this chain to the coast line. The result of Captain Perrier's measurements proved that Monte Cinto is the highest mountain in Corsica.

The last article of note is a short review of a recent memorandum by M. Charles Grad, on the "foehn" wind of Switzerland, a dry warm wind which he argues is analogous to the Sirocco, and is only a local modification of the great aerial current which flows from the Equator to the Pole.

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densation rather than curtailment (as far at least as may be consistent with the importance of the subject matter) will be aimed at, and no efforts will be spared to make the selection of papers at least as interesting as heretofore, while the form of the Magazine, which has met with such unqualified approval from all quarters, will be strictly adhered to. In fixing upon a price which brings the periodical within reach of a larger circle of readers, the Proprietors confidently appeal to the Educational Institutions throughout the country, as well as to the general public, to aid in the initiation and encouragement of the study of a science so useful in all its aspects, and one in which Englishmen have ever taken a foremost part.

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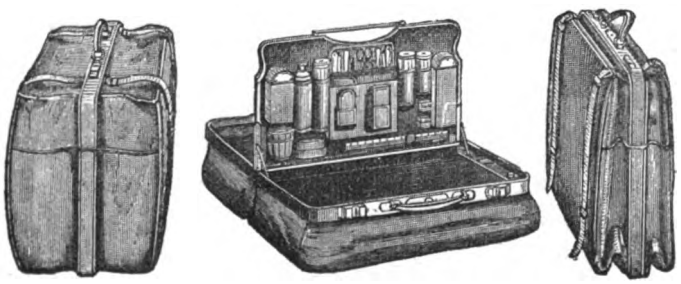

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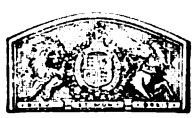

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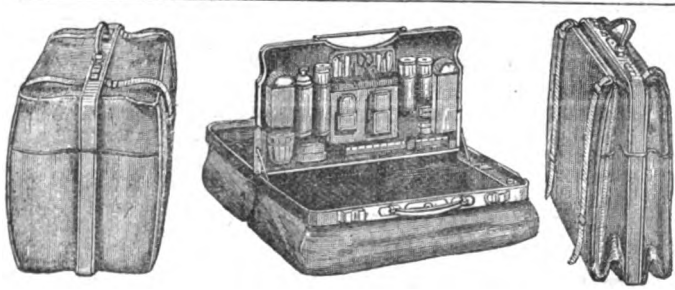

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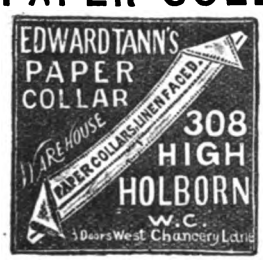

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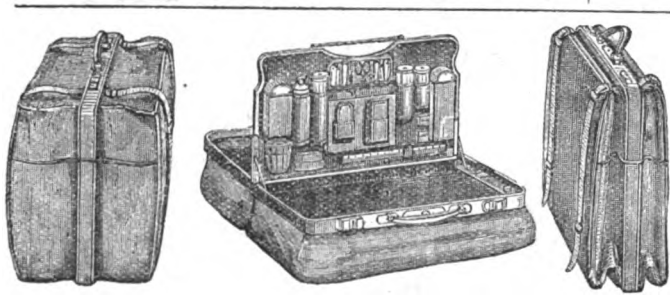

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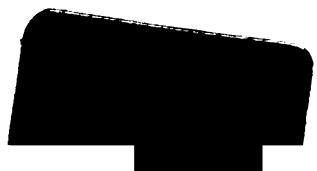

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